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#### OHIO ENVIRONMENTAL PROTECTION AGENCY

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MODULE 6

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Module 6 – Fischer-Tropsch and Product Upgrade

#### 1.0 PROCESS DESCRIPTION

# 1.1 Fischer-Tropsch

The Fischer-Tropsch (F-T) reaction will be carried out in three separate and parallel "trains" each having a single F-T reactor vessel. Each reactor produces several product and by-product streams. The liquid products will be routed to a common F-T Fractionator Heater (154 MMBtu/hr) and then to a single F-T fractionator column. F-T fractionator column products will be routed to the Product Upgrade block. Tailgas streams from the F-T reactors will be combined and sent to a common sponge oil column.

The F-T reaction will involve conversion of carbon monoxide (CO) and hydrogen  $(H_2)$  formed in the gasifier to hydrocarbons and water. CO and  $H_2$  will undergo synthesis at the surface of the catalyst particles according to the following reactions:

$$CO + 2 H_2 = -CH_2 + H_2O + Heat$$
  
- $CH_2$ - + - $CH_2$ - +  $H_2$  =  $H$ -( $CH_2$ )<sub>n</sub> - $H$  (paraffin)

Unreacted carbon monoxide and hydrogen, together with lower molecular weight hydrocarbons and byproduct water, will exit the reactor as a vapor. The vapor stream is cooled in two stages. In the first stage, higher molecular weight hydrocarbons will condense to form a "heavy" Light F-T liquid (HLFTL) intermediate product. In the second stage of cooling, lower and intermediate molecular weight hydrocarbons and water will condense yielding two liquid phases and a vapor stream. The upper liquid phase ("light" Light F-T liquid – LLFTL) consists of the lower and intermediate molecular weight hydrocarbons. The lower liquid phase will be oily water produced by the F-T reaction. The oily water will contain about 1% low molecular weight alcohol species. Very high molecular weight hydrocarbons will remain in the liquid state under reactor conditions and must be withdrawn directly from the reactor as a liquid stream (heavy F-T liquids – HFTL).

Most of the uncondensed vapors from the reactor cooling step (i.e., F-T tailgas) will be compressed and mixed with incoming syngas feed for return to the F-T reactors. A smaller portion, referred to as tailgas, will be purged to control build-up of inert gases and non-condensable light hydrocarbons in the reactor vapor loop. The purged tailgas will be combined with the tailgas streams of the other two F-T trains and fed to the sponge oil column located between the F-T reactors and the F-T fractionator column. At the sponge oil column, light hydrocarbon products will be absorbed. The tailgas, depleted of light hydrocarbons, will exit the top of the sponge oil column from where it will be diverted for use as fuel in process heaters and the combustion turbines. The sponge oil column will not be a source of atmospheric emissions.

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Six process heaters will be used in the F-T process. The F-T process heater design duties and draft types are listed below. The relationships of these heaters to process components are illustrated in figures provided in Attachment 6A.

	Design Duty	
Heater Name	(MMBtu/hr)	Draft Type
FT Fractionator Fired Heater	154.0	Mechanical
Nitrogen Heater	4.0	Natural
Hot Oil Heater	4.0	Natural
Hydrogen Stripping Heater	4.0	Natural
Oxidation Gas Heater	4.0	Natural
Reduction Gas Heater	4.0	Natural

#### 1.2 Product Upgrade

F-T products will be refined to FT-diesel, FT-naphtha, and liquefied petroleum gas (LPG) in a single product upgrade train. High molecular weight species will be hydrocracked to short chain paraffins. Cracking severity will be limited to minimize loss of high molecular weight species to light ends. Uncracked hydrocarbons will be separated from products and recycled to the hydrocracker reactor, essentially to extinction. Low molecular weight hydrocarbons not requiring hydrocracking will be hydrotreated to saturate olefins and alcohols. Liquid products from the hydrocracking and hydrotreating reactors will feed the F-T fractionator column and its side stripper (see Figure 16), which will split the feeds into a C5-C9 liquid distillate, a side-draw "distillate" (diesel range), and a bottoms stream of unconverted "wax." All of the liquid produced in the F-T reaction section will be exposed to the strong reducing conditions of one of the two hydroprocessing reactors before any exits the plant. Non-condensable overhead vapors will be liquefied by compression and chilling to form LPG. The F-T fractionator column will not be a source of air emissions. The F-T fractionator column will be sized to accommodate the full plant capacity, but will be capable of processing smaller volumes as each of the three F-T trains are brought on line.

Three process heaters will be used in the Product Upgrade section. The Product Upgrade process heater design duties and draft types are listed below. Refer to Attachment 6A for figures illustrating these heaters and other process components.

	Design Duty	
Heater Name	(MMBtu/hr)	Draft Type
Hydrocracker Feed Oil Heater	21.0	Mechanical
Hydrocracker Feed Hydrogen Heater	20.0	Mechanical
Production Fractionation Feed Heater	24.0	Mechanical

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#### 1.3 Vents to Low-Pressure Flare

A low-pressure flare will control emissions generated during regeneration of the F-T catalyst. To promote synthesis, the F-T catalyst will be periodically regenerated. When the catalytic activity drops to a selected level, the regeneration process will be initiated. Regeneration is a physical and chemical process that removes hydrocarbon deposits from the catalyst to maintain an active reaction surface. The F-T catalyst regeneration process consists of a semi-batch process where a portion of the catalyst in-process inventory is withdrawn to the regeneration section and an equal amount of regenerated catalyst is returned to it from the regeneration section approximately each week. A slurry containing a particulate catalyst in liquid suspension will be reacted with hydrogen and steam at reduced pressure to hydrogenate and volatilize heavy hydrocarbon deposits from the catalyst surface. Catalyst slurry is withdrawn from the F-T reactor, degassed, dried, oxidized, reduced, re-slurried in wax, and returned to the F-T reactor. These F-T catalyst regeneration steps will generate process vent emissions, although no catalyst will be emitted.

In the rotary dryer, the slurry is heated both indirectly and directly. Indirect heat is supplied by the hot oil circulating through both the agitator arms and rotary dryer shell. Direct heat is supplied to the rotary dryer contents by addition of hot nitrogen through sparge holes in the bottom of the rotary dryer. The hot oil and nitrogen heaters are fueled with tailgas (see Section 1.1 above).

Catalyst activation and reactivation processes will also occur. In the activation step, raw cobalt catalyst is reacted with  $H_2S$  and  $H_2$  to convert cobalt to cobalt sulfide, the chemical form needed to function as a catalyst. In the reactivation step, catalyst that has become less efficient is refreshed (reactivated) by passing more  $H_2S$  through the catalyst bed. Neither of these steps will produce air emissions.

The low-pressure flare will also control vent emissions from low pressure components in the event of an unscheduled event that requires a vessel to be depressurized in accordance with applicable engineering codes.

# 1.4 Valves, Flanges, Pumps, & Compressors

This module includes process equipment that requires use of numerous valves, flanges, pumps, compressors, and other components that will be in contact with gaseous or light liquid service and may be subject to leaks. The actual number of components will be refined during the detailed front end engineering design (FEED) study. Additional types of components may be identified during subsequent design phases. Initial estimates of component counts include:

- Pumps (20)
- Valves (250)

- Flanges (540)
- Compressors (13)

#### 2.0 AIR EMISSIONS INVENTORY

Air emissions from the F-T and Product Upgrade processes will be a result of fuel combustion in process heaters, thermal destruction of F-T catalyst regeneration gases in a low pressure flare, and fugitive volatile organic compound (VOC) emissions from equipment leaks. Descriptions of emission sources and their respective potential emissions calculations are provided below.

#### 2.1 Process Heaters

The process heaters at ORCF will be fired by natural gas or tailgas. The F-T process will include five 4-MMBtu/hr process heaters and one 154-MMBtu/hr heater. Emissions from the five 4-MMBtu/hr process heaters will be controlled by good combustion practices, good design, operation, and engineering practices, and use of clean fuels. Emissions from the one 154-MMBtu/hr process heater will be controlled by use of ultra low-NO<sub>x</sub> burners and selective catalytic reduction (SCR), good combustion practices, good design, operation, and engineering practices, and use of clean fuels

The Product Upgrade process will include three approximately 20 MMBtu/hr feed heaters, all of which will be controlled by use of ultra low-NO<sub>x</sub> burners and SCR, good combustion practices, good design, operation, and engineering practices, and use of clean fuels.

Emission factors for the heaters were obtained from AP-42 Chapter 1.4 – Natural Gas Combustion Tables 1.4-1 and 1.4-2. Emissions were calculated as follows:

$$\frac{MMBtu}{hr} \times \frac{scf}{Btu} \times \frac{lb}{MMscf} = \frac{lb}{hr}$$

Tailgas was utilized as the fuel source for the calculations to represent worst-case emission results. Tailgas represents the worst-case because the emission factor used is gas quantity-based, therefore, since the Btu value of the tailgas is lower than natural gas and thus more tailgas will be required to achieve the desired heater temperatures, the increase in emissions will be proportionately higher. The efficiency for the heaters was assumed to be 73%. Operations were assumed to be continuous for 365 days a year. Particulate emissions are assumed to be less than  $1.0 \, \mu m$  in diameter and therefore can be used to represent PM<sub>10</sub>.

Hazardous air pollutant emission rates from the process heaters are based on the emission factors for natural gas combustion presented in AP-42 Table 1.4-4. Those factors are assumed to be representative of emissions from combustion of tailgas due to the Module 5 gas cleanup steps that will have occurred prior to combustion of any tailgas. With respect to mercury, while elemental mercury is expected to be present in the raw syngas, the combination of carbon filtration, which alone has been shown to remove greater than 90 percent of elemental mercury and partitioning of mercury to slag, flyash, and the wet scrubbing system will remove mercury from syngas and tailgas to an estimated 52 parts per trillion (ppt) concentration. While the basis

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for EPA's default natural gas mercury emission factor is not provided in the available background document, typical mercury concentrations in natural gas have been reported to range between 1 and 200  $\mu g/m^3$  (Shafawi, A. et al, The Analyst, 1999, 124, 185-189). Even if it is assumed that the natural gas used to derive EPA's emission factors contained only 1  $\mu g/m^3$  (122 ppt) the emission estimates provided by the AP-42 factors would be double than that produced by burning tailgas.

Tables 6B-1 and 6B-2 (Attachment 6B) summarize the respective potential and actual emissions estimates for the process heaters.

#### 2.2 Low-Pressure Flare

Emission estimates for the low pressure flare have been based on AP-42 factors for combustion of the quantity of low-Btu fuel gas equal to the gas volume projected to be vented to the flare from the various low-pressure processes. VOC, CO, NO<sub>x</sub>, SO<sub>2</sub> and PM will be emitted. While the composition of the gas streams vented to the low pressure flare will vary, the flare will achieve 98% destruction efficiency for VOC emissions. This control efficiency along with good design and combustion practices for the low pressure flare represent Best Available Control Technology (BACT) for control of emissions from the regeneration of the F-T catalyst and other process vents. The pilot burner for the flare may be fueled by natural gas or tailgas. Engineering design estimates of principal pollutant emissions have been developed on a lb/MMBtu basis, as shown in the Supporting Calculations (Attachment 6B).

## 2.3 Valves, Flanges, Pumps, & Compressors

Refinery average emission factors were obtained from Table 2-2 of EPA's Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017). Fugitive emissions were calculated by the following equation based on the EPA's average emission factor approach.

$$Emission = Factor \times W_f \times \#Components$$

The weight fraction (W<sub>f</sub>) of total organic carbon (TOC) within the liquids is assumed to be 100% and TOC is assumed to be equal to VOC. To represent worst case conditions, the various streams are all assumed to contain light liquids. Light liquids are defined as liquids for which the sum of the concentrations of individual constituents with a vapor pressure over 0.3 kPa at 20 °C is greater than or equal to 20 weight percent. It is also assumed that there will be 2 flanges per pump and/or process valve. The emission results are summarized in Table 2.3 below.

As indicated in the BACT analysis provided in Section 4.0, use of leakless/sealless or low-emission pumps, valves, and compressors will reduce VOC emissions by over 99%. Implementation of a Leak Detection and Repair (LDAR) program for flanges will reduce fugitive VOC emissions by at least 68%.

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Table 2.3 VOC Emission Estimates from Equipment Leaks

		Emission	Potential		Actual	
		Factor				
Component	Quantity	(lb/hr)	lb/hr	ton/yr	lb/hr	ton/yr
Pump Seals (light liquid)	20	0.2513	5.0	22.0	0.05	0.2
Valves (light liquid)	250	0.0240	6.0	26.3	0.06	0.3
Flanges (Connectors)	540	0.00055	0.3	1.3	0.1	0.4
Compressor Seals	13	1.4021	18.2	79.8	0.2	0.8
Total			29.7	129.4	0.4	1.7

Hazardous air pollutant emissions from equipment leaks have been determined by partitioning the worst-case emission production profile (50% F-T diesel and 50% F-T naphtha) across the component count. Because F-T diesel does not contain HAPs, it is assumed that only 50% of the VOC emissions indicated above contain HAP emissions. As discussed in Modules 7 and 8, F-T naphtha contains 22.35 molar percent n-hexane. It is therefore assumed that 11.2% of the fugitive VOC emissions (22.35% of 50%) will be n-hexane and the balance will be non-HAP VOCs. Total n-hexane emissions are therefore estimated as 0.2 tpy.

#### 3.0 SOURCE-SPECIFIC APPLICABLE REGULATIONS

This section presents information concerning applicable state and federal regulations as well as specific exemptions, as appropriate. State regulatory references are to the Ohio Administrative Code (OAC), unless otherwise noted. Source-specific regulations are discussed relative to each permit application module. Facility-wide applicable regulations are addressed in Section 5.0 of the Application Introduction.

## 3.1 State Regulations

#### 3.1.1 Control of Visible Particulate Emissions from Stationary Sources (3745-17-07)

Fischer-Tropsch and Product Upgrade process heaters will be sources of particulate matter. Stationary sources are subject to Chapter 3745-17-07(A)(1)(a) which limits visible particulate emissions to less than 20% opacity as a six-minute average. Chapter 3745-17-07(A)(1)(b) further states that the 20% opacity limit may not be exceeded for more than six consecutive minutes in any sixty minutes and never shall the opacity exceed 60% as a 6-minute average.

#### 3.1.2 Restrictions on Particulate Emissions from Fuel Burning Equipment (3745-17-10)

This rule applies to sources using fuel combustion for the primary purpose of producing heat or power by indirect heat transfer. The process heaters used in the F-T and Product Upgrade processes meet this definition, therefore this rule applies. Section (B)(1) of the rule establishes an emission limit of 0.020 pounds of particulate per MMBtu of actual heat input for fuel burning equipment that fires only gaseous fuel. Allowable emission limits for the ORCF process heaters based on design duty would therefore be:

Table 3.1.2 Summary of Fuel Burning Particulate Limits

	Actual Heat Input	
	(Reflecting 73%	
	Efficiency)	PE Emission
Heater Name	(MMBtu/hr)	Limit (lb/hr)
FT Fractionator Fired Heater	211.0	4.2
Hydrocracker Feed Hydrogen Heater	27.4	0.55
Hydrocracker Feed Oil Heater	28.8	0.58
Production Fractionation Feed Heater	32.9	0.66
Nitrogen Heater	5.5	0.11
Hot Oil Heater	5.5	0.11
Hydrogen Stripping Heater	5.5	0.11
Oxidation Gas Heater	5.5	0.11
Reduction Gas Heater	5.5	0.11

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Emission estimates for the process heaters based on AP-42 emission factors for combustion of natural gas are approximately equal to these emission limits.

3.1.3 Control of Emissions of Organic Materials from Stationary Sources (3745-21-07)

This regulation is applicable to all new sources of organic materials. The rule requires sources of photochemically reactive materials to minimize such emissions through the use of the latest available control techniques and operating practices in accordance with best current technology. The use of the low-pressure flare to combust volatile organic materials emitted from the F-T catalyst regeneration and other process vents is determined to be the best current technology.

3.1.4 Control of Carbon Monoxide Emissions from Stationary Sources (3745-21-08)

This regulation applies to carbon monoxide emissions from grey iron cupola, blast furnace, basic oxygen steel furnaces, or the waste gas stream from catalyst regeneration of petroleum cracking systems, petroleum fluid cokers, or other petroleum processes. Because processes in this module have been determined to be subject to Federal regulations applicable to petroleum refineries, this rule is applicable to the process heaters in Module 6. According to Section (E) of this regulation, installation of new sources that will emit carbon monoxide from a petroleum process are prohibited unless the waste gas stream is burned at 1,300 °F for 0.3 seconds or greater in a direct-flame afterburner or boiler equipped with an indicating pyrometer positioned at the operator's eye level. Compliance with this regulation will be achieved through operation of the proposed catalytic oxidation system for the large and medium process heaters.

#### 3.1.5 Permits to Install New Sources (3745-31)

Fischer-Tropsch and Product Upgrade process heaters will generate criteria pollutants from the incomplete combustion of tailgas. The emission units from the process heaters are part of a major stationary source. Because the major stationary source is located within an attainment area for all criteria pollutants, according to 3745-31-12(A), each emissions unit is subject to a BACT. The BACT analysis for these emission units is provided in Section 4.0. In accordance with 3745-31-05(A)(3), sources are also required to employ best available technology (BAT). Because all sources and pollutants are addressed in the BACT analysis, BAT is assumed to have been achieved for affected emission units.

#### 3.2 Federal Regulations

3.2.1 Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced After November 7, 2006 (40 CFR 60 Subpart GGGa)

Portions of the ORCF facility are engaged in producing distillate fuel oils and other products through the distillation, cracking, and reforming of syngas. Therefore, portions of the facility

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will be subject to Subpart GGGa. The Product Upgrade process components shall be monitored for leaks and repair according to the requirements of §60.592a.

3.2.2 Standards of Performance for Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced After May 14. 2007 (40 CFR 60 Subpart Ja)

The three medium and one large process heaters associated with the Product Upgrade process will be petroleum refinery fuel gas combustion devices and therefore must comply with the emission limitations and requirements of this subpart including specified performance evaluations, test methods, and procedures. The standards for sulfur oxides in §60.102a(g) of this subpart require that either:

- the fuel gas burned in the affected heaters not contain hydrogen sulfide (H<sub>2</sub>S) in excess of 162 ppmv (3-hour rolling average) and 60 ppmv daily (365-day rolling average) or,
- the SO<sub>2</sub> concentration in the discharge not exceed 20 ppmv (dry basis at 0% excess air) for a 3-hour rolling average and in excess of 8 ppmv (dry basis at 0% excess air) daily for a 365-day rolling average.

The combustion in a flare of process upset gases or fuel gas that is released to the flare as a result of relief valve leakage or other emergency malfunctions is exempt from this subpart. Although the low pressure flare is discussed in this module, it is not part of the petroleum refining process (it is part of the F-T catalyst regeneration emission unit) so it is not subject to the requirements of this NSPS.

The affected heaters shall be operated in accordance with good air pollution control practice to minimize emissions, as required by 40 CFR 60.11(d). In addition, 40 CFR 60.102a(g)(2) limits the NO<sub>x</sub> emissions from process heaters that have a rated capacity greater than 40 MMBtu/hr. Therefore, NO<sub>x</sub> emissions from the 154 MMBtu/hr Fractionator Heater may not exceed 40 ppmv (dry basis corrected to 0% excess air) on a 24-hour rolling average basis.

3.2.3 National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries (40 CFR 63, Subpart CC)

The following affected sources are subject to Subpart CC when they are associated with petroleum refining process units as defined in 40 CFR 63.641. Section 63.641 defines a process unit as:

"the equipment assembled and connected by pipes or ducts to process raw and/or intermediate materials and to manufacture an intended product. A process unit includes any associated storage vessels. For the purpose of this subpart, process unit includes, but is not limited to, chemical manufacturing process units and petroleum refining process units."

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For purposes of this regulatory assessment, the process unit includes equipment starting with the Fractionator Heater and ending at the product storage tanks, as described in this Module of the PTI Application.

Group 1 Miscellaneous Process Vents: Group 1 miscellaneous process vents have a total organic HAP concentration greater than or equal to 20 ppmv with total VOC emissions greater than or equal to 6.8 kg/day (for new sources) at the outlet of the final recovery device, if any, and prior to the control device and prior to discharge to the atmosphere. Certain exclusions also apply, per 63.641. To the extent that Group 1 miscellaneous process vents are present at ORCF, the following citations will apply:

CITATION	GENERAL REQUIREMENTS			
63.643(a)(1)	Reduce emissions of organic HAP using a compliant flare.  ORCF has made provisions for use of a low-pressure flare			
	to reduce organic HAP emissions.			
63.644(a)(2)	Monitoring provisions shall be provided to continuously detect the presence of a pilot flame in the low-pressure flare.			
63.645	Test methods and procedures (incorporates the SOCMI Subpart G requirements, 40 CFR 63.116(a), by reference.)			

Storage Vessels Associated with Petroleum Refining Process Units: According to Subpart CC, a "Group 1 storage vessel means a storage vessel at an existing source..." (see §63.641). Because ORCF is not an existing source, in accordance with §63.641, ORCF's storage tanks will be considered "Group 2 storage vessels." The storage vessel provisions of Subpart CC apply to Group 1 Storage Vessels only (see §63.646(a)). As stated in §63.640(n)(3), after the compliance date (7/14/94), a Group 2 storage vessel that is part of a new source and is subject to the control requirements in Subpart Kb (§60.112b), is required only to comply with that subpart.

Wastewater Streams and Treatment Operations Associated with Petroleum Refining Process Units: 40 CFR 63.647, Wastewater Provisions, are applicable to Group 1 wastewater streams. A Group 1 wastewater stream is defined in 40 CFR 641 as having a total annual benzene loading  $\geq 10$  Mg/yr with a flow rate  $\geq 0.02$  lpm, a benzene concentration  $\geq 10$  ppmw, and that is not exempt from control under 40 CFR 61, Subpart FF (benzene waste operations). According to the draft NPDES permit for this facility (OEPA Permit No. 3IG00097\*AD), there is one wastewater stream (Internal Monitoring Station 605) that contains a discharge limitation for benzene. The maximum discharge limit is 134  $\mu$ g/l (0.134 ppm). This is significantly lower than the 10 ppm threshold for Subpart CC applicability. Consequently, ORCF does not believe that it will be subject to Subpart CC wastewater stream requirements.

**Equipment Leaks**: 40 CFR 63.648 Equipment leak standards are applicable to equipment leaks from petroleum refinery process units. An *equipment leak* is defined in 40 CFR 63.641 as:

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"emissions of organic hazardous air pollutants from a pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, or instrumentation system "in organic hazardous air pollutant service" as defined in this section. Vents from wastewater collection and conveyance systems (including, but not limited to wastewater drains, sewer vents, and sump drains), tank mixers, and sample valves on storage tanks are not equipment leaks."

In organic hazardous air pollutant service means:

"that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 5 percent by weight of total organic HAP's as determined according to the provisions of §63.180(d) of subpart H of this part and table 1 of this subpart. The provisions of §63.180(d) of subpart H also specify how to determine that a piece of equipment is not in organic HAP service."

Section 63.648 of Subpart CC states that new sources subject to the equipment leak standards shall comply with Subpart H - National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks (40 CFR 63.160). The following Subpart H citations apply.

CITATION	GENERAL REQUIREMENTS
63.162	Standards: General
63.163	Standards: Pumps in light liquid service.
63.164	Standards: Compressors
63.165	Standards: Pressure relief devices in gas/vapor service
63.166	Standards: Sampling connection systems
63.167	Standards: Open-ended valves or lines
63.168	Standards: Valves in gas/vapor service and in light liquid service
63.169	Standards: Pumps, valves, connectors, and agitators in heavy liquid service;
	instrumentation systems; and pressure relief devices in liquid service
63.170	Standards: Surge control vessels and bottoms receivers
63.171	Standards: Delay of repair
63.172	Standards: Closed-vent systems and control devices
63.173	Standards: Agitators in gas/vapor service and in light liquid service
63.174	Standards: Connectors in gas/vapor service and in light liquid service
63.175	Quality improvement program for valves
63.176	Quality improvement program for pumps
63.180	Test methods and procedures
63.181	Recordkeeping requirements
63.182	Reporting requirements

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3.2.3 Chemical Accident Prevention Provisions (40 CFR 68 Subpart G - Risk Management Plan)

The SCR to be implemented for the process heaters will employ ammonia to control  $NO_x$  emissions. The quantity of ammonia stored for the SCR system is expected to exceed the storage threshold for applicability of this rule (10,000 pounds). Therefore, ORCF will develop a Risk Management Plant (RMP) that includes accidental release prevention and emergency response policies and program; regulated substances handled; general accidental release prevention program; chemical-specific prevention steps; and measures to be implemented to ensure safety.

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# 4.0 BACT ANALYSIS

As discussed in Section 2.0, the Fischer-Tropsch and Product Upgrade processes will generate air emissions from three process activities: fuel combustion in process heaters; venting of F-T catalyst regeneration exhaust and other process vents to a low pressure flare; and fugitive emissions of VOC from leaking valves, flanges, pumps, and compressors. The BACT analyses for all nine process heaters are presented together in Sections 4.1 through 4.5. The heaters include five units with ratings of 4 MMBtu/hr (referred to here are "small units"), three "medium units" with rating of 20, 21, and 24 MMBtu/hr and one "large unit" with a rating of 154 MMBtu/hr. The small units will all operate under natural draft and will each vent to a dedicated stack. The medium and large units will operate via forced (mechanical) draft and will be ducted to a common stack.

Section 4.6 presents the BACT analysis for VOC emissions from the low pressure flare. The BACT analysis for VOC emissions from equipment leaks is presented in Section 4.7.

#### 4.1 Process Heaters – Particulate Matter

The nine process heaters associated with the Fischer-Tropsch and Product Upgrade operations will be sources of particulate emissions (PE). The process heaters are not primary sources of particulates because they will burn clean tailgas or natural gas. The particulates in the exhaust will consist of residual inerts that have passed through the upstream cleanup processes. This section presents the BACT analysis for PE from those sources. The following table provides technical details regarding the proposed ORCF process heaters.

Table 4.1 Summary of ORCF Process Heaters

Machanical on Land Heat Input

	Mechanical or	Heat Input	BACT
	Natural Draft	Rating	Analysis
Description		(MMBtu/hr)	Reference
F-T Fractionator Fired Heater		154.0	Large
Hydrocracker Feed Hydrogen Heater		20.0	
Hydrocracker Feed Oil Heater	Mechanical	21.0	Medium
Production Fractionation Feed			Medium
Heater		24.0	
Nitrogen Heater			
Hot Oil Heater			
Hydrogen Stripping Heater	Natural	4.0	Small
Oxidation Gas Heater			
Reduction Gas Heater			

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#### 4.1.1 Available Control Technologies – Particulate Matter

Separate reviews of the RACT, BACT, LAER Clearinghouse (RBLC) database were conducted for Process 12.300 "Gaseous Fuel & Gaseous Fuel Mixtures (>100 MMBtu/h) & ≤250 MMBtu/h)" and for Process 13.300 "Gaseous Fuel & Gaseous Fuel Mixtures (≤100 MMBtu/h). The following particulate control technologies were identified:

- Clean fuel use and good combustion practices
- No reasonable controls

In addition to use of clean fuels as a particulate emissions control, add-on technologies such as fabric fume collectors and scrubbers could be applied. However, these add-on technologies have limitations when applied to clean combustion gases. These limitations are discussed below.

Fabric fume collectors are generally designed to capture and remove high concentration particulate streams. Fabric design generally limits the inlet air temperatures to a maximum level of approximately 500 °F (significantly lower than the expected 650 to 775 °F exhaust temperature range from these process heaters). Removal efficiencies for particulates are generally close to 99% with outlet loadings less than or equal to 0.005 gr/dscf.

Wet scrubbers are generally designed to capture and remove high concentration particulate streams. Wet scrubbers are generally designed to operate at temperatures greater than those of fabric fume collectors. Removal efficiencies for particulates are generally close to 99% with outlet loadings of less than or equal to 0.01 gr/dscf.

#### 4.1.2 Technically Infeasible Options – Particulate Matter

Fabric fume collectors and wet scrubbers, while technically feasible if design modifications are performed, are not necessary based on the expected concentrations of particulates after the gas stream. Table 4.1.2 presents the PE emission rates, expected flow rates, and outlet grain loading of particulate from the process heaters.

Source		Emissio	n Rate	Flow Rate	Grain Loading
Source	tpy	Lb/hr	Grains/min	(scfm)	(gr/dscf)
Small Units (4 MMBtu/hr)	0.4	0.091	10.65	2,213	0.0044
Medium Unit (20 MMBtu/hr)	2.0	0.456	53.3	11,620	0.0046
Medium Unit (21 MMBtu/hr)	1.9	0.433	50.6	11,067	0.0046
Medium Unit (24 MMBtu/hr)	2.3	0.525	50.6	13,280	0.0046
Large Unit (154 MMBtu/hr)	14.5	3.31	386	85,212	0.0045

Table 4.1.2 Summary of Process Heater Particulate Emissions

The outlet grain loadings are less than the 0.005 established as BACT performance criteria for baghouse units. These numbers are easily achieved given the design criteria and combustion

practices established for these process heaters even without the use of add-on controls. However, add-on controls cannot be eliminated as being technically infeasible except for the small process heaters which will not be equipped with mechanical draft systems. Fume collectors and wet scrubbers have been advanced for BACT review for the medium and large process heaters only.

# 4.1.3 Technology Ranking - Particulate Matter

Table 4.1.3 Estimated PE Control Technology Efficiencies for Process Heaters

Technology	Estimated Control	Basis
	Efficiency (%)	
Fabric Fume Collector	>99	EPA-452/F-03-026
Wet Scrubber	50 to 95%	EPA-452/F-03-015
Use of only clean fuels and good combustion practices	No Data	NA

#### 4.1.4 Evaluate Most Effective Controls - Particulate Matter

Controlling particulate emissions from these process heaters with a baghouse, beyond the levels established for other PE sources as BACT, would require installation of some type of cooling system, probably a dilution air damper to introduce cooler ambient air into the stream to reduce temperatures of the gas such that the 500 °F criteria could be achieved. The dilution air required to cool the gas to 500 °F would be approximately 43% of the inlet volumes.

Assuming the total volume of air to be handled by the baghouse is 143% of the design draft volumes, the costs for this add-on control can be determined. The following costs have been evaluated based upon the large process heater. The total air volume to be processed, including dilution air would be 121,853 scfm (i.e., 85,212 x 1.43). Using the cost model information provided in the USEPA Air Pollution Control Technology Fact Sheet (EPA 452/F-03-026), capital costs for a reverse-air baghouse would range from \$9 to \$85/scfm. The costs for this alternative are based on a capital cost for the baghouse equipment of \$25/scfm and the capital cost factors for fabric filters provided by the US EPA (Table 1.9 from Chapter 6 EPA/452/B-02-01). Accordingly, the total capital investment for this type of device would be approximately \$6,500,000.

Indirect capital costs would include engineering and supervision, construction and field expenses, start-up and performance tests, and contingencies. For purposes of this analysis they are assumed to be included in the total capital investment estimated above. The capital recovery cost, therefore, would be the product of the investment (\$6,500,000) and the capital recovery factor (CRF).

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The CRF is calculated according to the following equation:

$$CRF = [i(1+i)^n]/[(1+i)^n-1]$$

where:

CRF= capital recovery factor i = interest rate (assumed at 7 percent) n = equipment life (assumed 10 years for the equipment)

According to this equation, the CRF is 0.1424 and the resulting annual capital recovery cost would be about \$925,600 (i.e., 0.1424 x \$6,500,000).

In addition to the direct and indirect capital costs, there would be direct annual costs associated with operating the baghouse. These costs would include operating labor, maintenance labor, materials, utilities, replacement parts, and disposal. Detailed annual operating costs have not been included in this analysis.

Assuming that 99.9% of the particulate emissions from the process heaters could be removed with the baghouse, the cost per ton of pollutants removed would be:

$$$925,000 / 14.5 \text{ tons} = $63,793 \text{ per ton}$$

As this analysis indicates, control of PE emissions from the process heaters is not cost-effective. The same conclusion is reached for the medium process heaters based on the lower PE levels that would be controlled.

Similarly, using the cost model information provided in the USEPA Air Pollution Control Technology Fact Sheet for wet scrubbers (EPA 452/F-03-015), capital costs would range from \$11 to \$55/scfm. For the large process heater, the capital cost would be about \$2.8 million based on the mid-range value. Based on the CRF of 0.1424, the annual capital recovery cost would be about \$400,000. Adding to that the estimated operating and maintenance costs (about \$2.7 million), the annualized cost would be approximately \$3.1 million. Even assuming that 95% of the particulate emissions from the process heater could be removed with a wet scrubber, the cost per ton of particulate removed would be:

$$3,100,000 / 14.5$$
 tons =  $213,793$  per ton

As in the baghouse analysis, the same conclusion is reached for the medium process heaters. This analysis therefore concludes that add-on control technologies for control of particulate matter from the process heaters are not cost-effective.

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# 4.1.5 Proposed BACT Limits and Control Options - Particulate Matter

Based on the cost-effectiveness evaluation presented above, it is determined that BACT for particulate control from the process heaters is to use clean fuels and good combustion practices. The proposed BACT limits for the process heaters are based on the AP-42 emission factors for particulate matter from combustion of natural gas, as adjusted from the lower heating value of tailgas (487.5 Btu/scf), as shown below. The proposed limits reflect the expectation that exhausts from the medium and large process heaters will be combined to enable cost-effective control of NO<sub>x</sub> emissions.

Proposed PE Limit - Medium and Large Process Heaters: 0.005 gr/dscf

• Proposed PE Limit - Small Process Heaters: 0.005 gr/dscf

#### 4.2 Module 6 - Process Heaters – Carbon Monoxide

The only sources of carbon monoxide (CO) emissions from Fischer-Tropsch and Product Upgrade are the nine process heaters. This section presents the BACT analysis for CO emissions from those sources.

# 4.2.1 Available Control Technologies - Carbon Monoxide

CO emissions are due to incomplete combustion that typically results from inadequate air and fuel mixing, a lack of available oxygen, or low temperatures in the combustion zone. Fuel quality and good combustion practices can limit CO emissions. The RBLC database contains the following BACT determinations for CO:

- Good combustion practices
- Good design, operation, and engineering practices
- Clean fuels

Additional technologies that have been identified include:

- EMx<sup>TM</sup> (formerly SCONOx<sup>TM</sup>)
- Catalytic Oxidation

#### 4.2.2 Technically Infeasible Options - Carbon Monoxide

None of the add-on control technologies are technically feasible for the small process heaters because they will not be equipped with mechanical draft systems. The following discussion applies to the medium and large process heaters.

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# EMx<sup>TM</sup> (formerly SCONOx<sup>TM</sup>)

EMx<sup>TM</sup> - a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO<sub>x</sub>, CO, and VOC emissions. Unlike SCR, the EMx<sup>TM</sup> system does not use ammonia. Instead, the EMx<sup>TM</sup> system uses a coated catalyst to oxidize carbon monoxide (CO) to carbon dioxide (CO<sub>2</sub>) and water. The EMx<sup>TM</sup> system can operate effectively at temperatures ranging from 280 to 750 °F but is sensitive to trace amounts of sulfur in the exhaust. EMx<sup>TM</sup> is technically feasible for this application because the operating temperature is within the exhaust ranges for the process heaters and the exhaust gas will not contain quantities of residual sulfur that would adversely affect performance. However, EMx<sup>TM</sup> has not been demonstrated on process heaters. The largest known application is on a 43-MW combined cycle plant. Technical problems associated with operation in conjunction with process heaters are unknown. Additional concerns with EMx<sup>TM</sup> control technology include process complexity (multiple catalytic oxidation/absorption/regeneration systems), reliance on only one supplier, and the relatively brief operating history of the technology. Based on these considerations, EMx<sup>TM</sup> technology is determined to be technologically infeasible for the ORCF process heaters.

#### 4.2.3 Technology Ranking - Carbon Monoxide

Table 4.2.3 Estimated CO Control Technology Efficiencies for Process Heaters

Technology	Estimated	Basis
	Control	
	Efficiency (%)	
Oxidation Catalyst (medium and large units only)	92.5 (90-95)	EPA/452/B-02-001
		Ch. 2
Good Design, Operation, Engineering, &	No Data	NA
Combustion Practices		

## 4.2.4 Evaluate Most Effective Controls – Carbon Monoxide

#### Large and Medium Process Heaters

#### Catalytic Oxidation

Catalytic oxidation is a post-combustion technology that uses a catalyst to oxidize CO into CO<sub>2</sub> or H<sub>2</sub>O. The technology has most commonly been applied to natural gas fired combustion turbines. Catalytic oxidizers are vulnerable to chemicals and/or particulate matter that masks or fouls the surface of the catalyst. However, at ORCF the potential for fouling of the catalyst by particulate and other materials in the exhaust gas will be minimal because clean gas will be used. Catalytic oxidation allows reactions to occur at temperatures in the 300 to 900 °F range that absent a catalyst would require much greater temperatures to drive the reactions. The exhaust

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from the process heaters at ORCF will be in the 600 to 800 °F range. This allows catalytic oxidation to be technically feasible.

Since these four process heaters will already be ducted together to a single SCR to control  $NO_x$  emissions (as discussed in the Section 4.3.4 of this analysis) a single catalytic oxidizer can be installed to control their cumulative CO emissions.

Using the cost model information provided in the USEPA Air Pollution Control Technology Fact Sheet for catalytic incineration (EPA-452/F-03-018), capital costs would range from \$22 to \$90/scfm. For the combined flow of the four process heaters (one large and three medium: 121,179 scfm), the capital cost is estimated to be \$6.79 million based on the mid-range cost. Based on the CRF of 0.1424, the annual capital recovery cost would be about \$966,330. Adding to that the estimated operating and maintenance costs (about \$1.76 million), the annualized cost would be approximately \$2.72 million. Assuming a control efficiency of 92.5% for the four process heaters, the cost per ton of CO removed would be:

2,720,000 / 210.25 tons = 12,937 per ton

Based on the outcome of this analysis, ORCF concludes that use of an oxidation catalyst would not be a cost-effective control technology for carbon monoxide control from the four combined process heaters.

#### **Small Process Heaters**

Good combustion practices, good design, operation, and engineering practices, and use of clean fuels are the only feasible control strategies and they have historically been selected as BACT for CO emissions from small process heaters.

#### 4.2.5 Proposed BACT Limits and Control Options – Carbon Monoxide

Use of good combustion practices, good design, operation, and engineering practices, and use of clean fuels have been selected as BACT for potential CO emissions from the proposed process heaters. The proposed BACT limit for CO emissions from process heaters shown below is based on the proposed hourly emission rate divided by the heat input of each unit. Because burner vendors have not been selected at this time, performance guarantees are not available. Upon conclusion of the FEED study, ORCF will revisit this proposed BACT limit and incorporate updated information into the permit application documents.

Proposed CO Limit - Process Heaters: 0.24 lb/MMBtu

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## 4.3 Module 6 - Process Heaters - Nitrogen Oxide

The only sources of nitrogen oxides  $(NO_x)$  emissions from Fischer-Tropsch and Product Upgrade are the nine process heaters. This section presents the BACT analysis for  $NO_x$  emissions from those sources.

# 4.3.1 Available Control Technologies - Nitrogen Oxide

The criteria pollutant NO<sub>x</sub> is primarily formed in combustion processes in two ways:

- 1) the reaction of elemental nitrogen and oxygen in the combustion air within the high temperature environment of the combustor (thermal  $NO_x$ ), and 2) the oxidation of nitrogen contained in the fuel (fuel  $NO_x$ ). The RBLC database contains the following BACT determinations for  $NO_x$  from combustion processes similar to the process heaters:
  - Low-NO<sub>x</sub> burners (LNB)
  - Ultra Low-NO<sub>x</sub> burners (ULNB)
  - Selective catalytic reduction (SCR)
  - Flue gas recirculation (FGR)
  - Good Combustion Practices (GCP)

The following technologies or combinations of technologies have also been used to control NO<sub>x</sub> from combustion sources:

- Selective non-catalytic reduction (SNCR)
- Non-selective catalytic reduction (NSCR)
- EMx<sup>TM</sup> (formerly SCONOx<sup>TM</sup>)
- ULNB with SCR
- LNB with SCR
- LNB with SNCR

#### 4.3.2 Technically Infeasible Options - Nitrogen Oxide

#### Selective Non-Catalytic Reduction

Selective non-catalytic reduction is a post-combustion NO<sub>x</sub> control technology that uses ammonia or urea to react with NO<sub>x</sub> to form nitrogen and water. As the name implies, a catalyst is not needed. The technology requires that the reagent and the exhaust gas are uniformly mixed within a narrow temperature range (1,600 to 2,100 °F). No examples have been found where SNCR has been applied to small thermal dryers or process heaters. Because the process heaters will generate a gas stream that exits the low pressure flare between 650 and 775 °F, additional heat input would be required to increase the flue gas temperature to the required operating range.

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That increase in temperature would in turn produce additional  $NO_x$  emissions. SCNR is therefore considered to be technically infeasible for control of  $NO_x$  from the process heaters.

#### Non-Selective Catalytic Reduction

Non-selective catalytic reduction (NSCR) uses a catalyst without injected reagents to reduce  $NO_x$  emissions in an exhaust gas stream. NSCR is typically used in automobile exhaust and rich-burn stationary internal combustion engines. NSCR uses a platinum/rhodium catalyst and is only effective in a stoichiometric or fuel-rich environment where the combustion gas is nearly depleted of oxygen. This type of environment does not exist in the exhaust from the process heaters therefore NSCR is not technologically feasible for this application.

#### EMx<sup>TM</sup> (formerly SCONOx<sup>TM</sup>)

EMx<sup>TM</sup> - a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO<sub>x</sub>, CO, and VOC emissions. Unlike SCR, the EMx<sup>TM</sup> system does not use ammonia. Instead, the EMx<sup>TM</sup> system uses a coated catalyst to oxidize nitrogen oxide (NO) to nitrogen dioxide (NO<sub>2</sub>) and to adsorb NO<sub>2</sub> onto the coating on the catalyst. As discussed in Section 4.2.2, the EMx<sup>TM</sup> system has been determined to be technologically infeasible for the ORCF process heaters.

#### Selective Catalytic Reduction

Selective catalytic reduction is a post-combustion NO<sub>x</sub> control technology that uses ammonia or urea to react with NO<sub>x</sub> to form nitrogen and water. As the name implies, a catalyst is needed. The technology requires that the reagent and the exhaust gas are uniformly mixed within a temperature range of 300 to 900 °F. Because the process heaters will generate a gas stream that exits the low pressure flare between 650 and 775 °F, no additional heat input would be required to increase the flue gas temperature to the required operating range. SCR is only feasible for mechanical draft controlled process heaters. Natural draft has been selected as a design feature of these five process heaters. SCR is therefore considered to be technically infeasible for control of NO<sub>x</sub> from the 4MMBtu/hr natural draft process heaters.

#### Low & Ultra Low-NO, Burners

LNB technology is designed for burners with a minimum capacity of 10 MMBtu/hr. It is therefore considered to be technically infeasible for the small process heaters.

#### 4.3.3 Technology Ranking - Nitrogen Oxide

Technically feasible NO<sub>x</sub> control options for the process heaters are ranked here according to expected potential emission reductions.

Table 4.3.3 Estimated NO<sub>x</sub> Control Technology Efficiencies for Process Heaters

Technology	Estimated Control Efficiency (%)	Basis
Ultra LNB with SCR	95	Based on combination of control efficiencies: 75% LNB + 80% SCR
LNB with SCR	88	EPA-452/F-03-032, 11/99
SCR	80 (70-90)	EPA-452/F-03-032, 7/03
ULNB	75	EPA-452/F-03-032, 11/99
LNB and FGR	55	EPA-452/F-03-032, 11/99
LNB	50	EPA-452/F-03-032, 11/99
FGR*	10	Derived from LNB + FGR
Good Combustion Practices	ND	NA

<sup>\*</sup> FGR requires mechanical draft and is not a stand-alone technology; it is typically combined with LNBs.

#### 4.3.4 Evaluate Most Effective Controls – Nitrogen Oxide

## Medium and Large Process Heaters

Mechanical draft has been selected as a design feature of these four process heaters. Therefore SCR is an available control technology. Cost evaluations presented in Attachment 6C indicate that SCR is cost-effective for the large process heater alone but is not for the medium-sized process heaters alone. However, it has been determined that if all four units (one large and three medium) are ducted together, a single SCR would be cost-effective. As shown in Table 4.3.4, the cost effectiveness of the highest ranked technology, ultra low-NO<sub>x</sub> burners and ducting to a single SCR, has also been shown to be cost effective. Therefore ducting of the three medium process heaters and the large process heater to a single SCR has been selected as BACT.

Table 4.3.4 Cost Effectiveness of NO<sub>x</sub> Control Technologies for Process Heaters

Technology	Estimated Cost Effectiveness for Different Sized Heaters (US Dollars per ton NO <sub>x</sub> controlled)				
	154 MMBtu/hr	24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr	
ULNB + Ducting to single SCR		\$4,	454		
ULNB + Individual SCRs	\$4,515	\$7,140	\$7,429	\$7,534	
LNB + SCR	\$4,872	\$7,675	\$7,983	\$8,094	
Individual SCRs	\$1,909	\$7,833	\$8,140	\$8,245	
Ducting to single SCR		\$2,	200		
ULNB	\$3,683	\$688	\$728	\$747	
ULNB + FGR	\$3,640	\$1,572	\$1,675	\$1,718	
LNB + FGR	\$5,291	\$2,235	\$2,377	\$2,436	
LNB	\$5,521	\$975	\$1,026	\$1,052	
FGR*	\$1,499	\$7,418	\$7,945	\$8,138	
GCP	NA	NA	NA	NA	

<sup>\*</sup> FGR requires mechanical draft and is not a stand-alone technology; it is typically combined with LNBs.

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# 4.3.5 Proposed BACT Limits and Control Options - Nitrogen Dioxide

# Medium and Large Process Heaters

While emission estimates have indicated NO<sub>x</sub>, emission limits will be reported in terms of the regulated air pollutant, NO<sub>2</sub>. The proposed BACT limit for NO<sub>2</sub> emissions from the combined medium and large process heater stack is shown below. Because burner and SCR vendors have not been selected at this time, performance guarantees are not available. Upon conclusion of the FEED study, ORCF will revisit this proposed BACT limit and incorporate updated information into the permit application documents.

• Proposed NO<sub>2</sub> Limit - Medium and Large Process Heaters: 0.08 lb/MMBtu

The proposed BACT limit is based on the proposed hourly emission rate of the four process heaters combined (16.8 lb/hr) divided by the heat input of the combined units (219 MMBtu/hr).

#### Small Process Heaters

Good combustion practices has been selected as BACT for these process heaters as this represents the most effective control technology identified. The proposed BACT limit is based on the proposed hourly emission rate (1.12 lb/hr) divided by the heat input of the combined units (4 MMBtu/hr).

- Proposed NO<sub>2</sub> Limit Small Process Heaters: 0.28 lb/MMBtu
- 4.4 Module 6 Process Heaters Volatile Organic Compounds (VOC)

Volatile Organic Compound (VOC) emissions are due to incomplete combustion that typically results from inadequate air and fuel mixing, a lack of available oxygen, or low temperatures in the combustion zone. Fuel quality and good combustion practices can limit VOC emissions.

#### 4.4.1 Available Control Technologies – VOC

The RBLC database contains the following BACT determinations for VOC from combustion processes similar to the process heaters:

- Good combustion practices
- Good design, operation, and engineering practices
- Clean fuels
- Catalytic Oxidation

In addition, EMx<sup>TM</sup> (formerly SCONOx<sup>TM</sup>) has been applied to the control of VOC emissions from combustion sources.

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# 4.4.2 Technically Infeasible Options - Volatile Organic Compounds (VOC)

Add-on control technologies, such as catalytic oxidation, are technically infeasible for the small process heaters because they will not be equipped with mechanical draft systems. As discussed in Section 4.2.2, EMx<sup>TM</sup> has been determined to be technically infeasible for the ORCF process heaters.

# 4.4.3 Technology Ranking - Volatile Organic Compounds (VOC)

Table 4.4.3 Estimated CO Control Technology Efficiencies for Process Heaters

Technology	Estimated Control Efficiency (%)	Basis
Oxidation Catalyst	92.5 (90-95)	EPA/452/B-02-001 Ch. 2
Good Design, Operation, Engineering, & Combustion Practices	ND	NA

#### 4.4.4 Evaluate Most Effective Controls – VOC

Catalytic oxidation is a post-combustion control that uses a catalyst to oxidize VOC into primarily CO<sub>2</sub> and H<sub>2</sub>O. Further discussion of this technology is provided in Section 4.2.4. Use of an oxidation catalyst was determined to be not cost-effective for control of CO emissions. Use of the same technology for control of VOC emissions would therefore not be cost-effective either because fewer tons of VOC would be controlled. Consequently, good combustion practices, good design, operation, and engineering practices, and use of clean fuels have been selected as BACT for VOC emissions from the process heaters.

# 4.4.5 Proposed BACT Limits and Control Options - VOC

Good combustion practices has been selected as BACT for these process heaters as this represents the most effective control technology identified. The proposed BACT limit is based on the proposed hourly emission rate divided by the heat input of the respective units.

Proposed VOC Limit - Process Heaters: 0.02 lb/MMBtu

#### 4.5 Module 6 - Process Heaters - Sulfur Dioxide

Fuel gas burned in the process heaters will be a source of sulfur dioxide (SO<sub>2</sub>) emissions. This section presents the BACT analysis for SO<sub>2</sub> emissions from that source.

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#### 4.5.1 Available Control Technologies - Sulfur Dioxide

Sulfur dioxide (SO<sub>2</sub>) emissions are due to combustion of sulfur present in fuel. The control of SO<sub>2</sub> emissions is most directly related to using low sulfur fuel. The RBLC database contains the following BACT determinations for SO<sub>2</sub>:

- Various fuel sulfur limits (%)
- Clean Fuels (Low Sulfur Fuels)
- Natural Gas
- Good combustion practice

## 4.5.2 Technically Infeasible Options - Sulfur Dioxide

All of the above-listed technologies are feasible for control of SO<sub>2</sub> emissions from the process heaters.

## 4.5.3 Technology Ranking - Sulfur Dioxide

Good combustion practices including good design of the process heaters and proper maintenance are determined to be the only feasible technologies for control of sulfur dioxide emissions from the process heaters.

#### 4.5.4 Evaluate Most Effective Controls – Sulfur Dioxide

A combination of good design, good combustion practices, and proper maintenance is selected as BACT for SO<sub>2</sub> emissions from the process heaters.

#### 4.5.5 Proposed BACT Limits and Control Options - Sulfur Dioxide

The use of good design and good combustion practices has been selected as BACT for potential SO<sub>2</sub> emissions from the process heaters.

# Medium and Large Process Heaters

The proposed BACT limit for SO<sub>2</sub> emissions from the combined medium and large process heater stack is shown below. Because burner vendors have not been selected at this time, performance guarantees are not available. Upon conclusion of the FEED study, ORCF will revisit this proposed BACT limit and incorporate updated information into the permit application documents.

Proposed SO<sub>2</sub> Limit - Medium and Large Process Heaters: 0.002 lb/MMBtu

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The proposed BACT limit is based on the proposed hourly emission rate of the four process heaters combined (0.37 lb/hr) divided by the heat input of the combined units (219 MMBtu/hr).

#### Small Process Heaters

Good combustion practices have been selected as BACT for these process heaters as this represents the most effective control technology identified. The proposed BACT limit is based on the proposed hourly emission rate (0.0069 lb/hr) divided by the heat input of the combined units (4 MMBtu/hr).

Proposed VOC Limit - Small Process Heaters: 0.002 lb/MMBtu

#### 4.6 Low-Pressure Flare – VOC

The second group of air emission sources from this module are various vents associated with the regeneration of the F-T catalyst. Gases produced during the regeneration process will contain volatile organic compounds (VOCs). A low-pressure flare will be used to destroy these VOC emissions prior to being vented to the atmosphere. This section presents the BACT analysis for VOC emissions from the low-pressure flare.

## 4.6.1 Available Control Technologies - VOC

VOC emissions are due to incomplete combustion that typically results from inadequate air and fuel mixing, a lack of available oxygen, or low temperatures in the combustion zone. Fuel quality and good combustion practices can limit VOC emissions. A review of the RBLC database for Process Type 19.3 – Flares, located BACT determinations for VOC as follow:

- Flare is VOC control (i.e., the flare was indicated as BACT for the process)
- Good combustion practice
- Limited operation

# 4.6.2 Technically Infeasible Options - Volatile Organic Compounds

Limiting the operating hours of the flare is technically infeasible. The duration and frequency of process vent discharges cannot be anticipated.

#### 4.6.3 Technology Ranking - Volatile Organic Compounds

Good design and combustion practices are the only feasible control strategies that have been identified. Good combustion practice has historically been selected as BACT for VOC emissions from flares.

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#### 4.6.4 Evaluate Most Effective Controls - Volatile Organic Compounds

A combination of good design and combustion practices is selected as BACT for VOC emissions from the high pressure flare.

# 4.6.5 Proposed BACT Limits and Control Options - Volatile Organic Compounds

The use of good design and good combustion practices has been selected as BACT for potential VOC emissions from the low-pressure flare. The proposed BACT limit is based on the proposed hourly emission rate (0.033 lb/hr) divided by the heat input of the combined units (146 MMBtu/hr).

• Proposed VOC Limit – Low-Pressure Flare: 0.0002 lb/MMBtu

#### 4.7 Low-Pressure Flare – Carbon Monoxide

The low pressure flare will be a source of carbon monoxide (CO) emissions. This section presents the BACT analysis for CO emissions from that source.

#### 4.7.1 Available Control Technologies – Carbon Monoxide

Carbon monoxide emissions are due to incomplete combustion that typically results from inadequate air and fuel mixing, a lack of available oxygen, or low temperatures in the combustion zone. Fuel quality and good combustion practices can limit CO emissions. A search of RBLC for Process Type 19.3 - Flares, located several BACT determinations for carbon monoxide, as listed below.

- Limited operating hours
- Follow requirements of 40 CFR 60.18
- Good combustion practice
- Good design and proper operating practices, comply with 40 CFR 60.18
- Proper maintenance including monitoring for the presence of a flame

#### 4.7.2 Technically Infeasible Options - Carbon Monoxide

Limiting the operating hours of the flare is technically infeasible. The duration and frequency of process upsets and emergencies cannot be anticipated.

The requirements of 40 CFR 60.18 apply to control devices that are used to achieve compliance with other applicable subparts of 40 CFR 60 and 61. While operation of the flare is not subject to these guidelines, because prior BACT determinations have referenced them, they are presented here:

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- Flares shall be designed for and operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.
- Flares shall be operated with a flame present at all times
- An option is provided for adhering with a heat content specification (minimum 300 Btu/scf for steam- or air-assisted, 200 Btu/scf if nonassisted) and a maximum tip velocity depending on the type of flare, or specific stack dimensions for nonassisted flares.

Because engineering details of the final flare design have not been developed at this time, the feasibility of adherence to the 40 CFR 60.18 guidelines can not be determined.

# 4.7.3 Technology Ranking - Carbon Monoxide

Good design and combustion practices are the only feasible control strategies that have been identified. Good combustion practice has historically been selected as BACT for CO emissions from flares.

## 4.7.4 Evaluate Most Effective Controls - Carbon Monoxide

A combination of good design and combustion practices is selected as BACT for CO emissions from the low pressure flare.

## 4.7.5 Proposed BACT Limits and Control Options - Carbon Monoxide

The use of good design and good combustion practices has been selected as BACT for potential CO emissions from the low pressure flare. The proposed BACT limit of 0.17 lb/MMBtu is based on the maximum hourly projected emissions (25.2 lb/hr) and the maximum flare heat input (146 MMBtu/hr)

# 4.8 Low-Pressure Flare – Nitrogen Oxides

The low pressure flare will be a source of nitrogen oxide  $(NO_x)$  emissions. This section presents the BACT analysis for  $NO_x$  emissions from that source.

#### 4.8.1 Available Control Technologies – Nitrogen Oxides

A search of RBLC for Process Type 19.3 - Flares, located several BACT determinations for nitrogen oxides, as listed below.

- Limited operating hours
- Follow requirements of 40 CFR 60.18
- Good combustion practice
- Good design and proper operating practices, comply with 40 CFR 60.18
- Proper maintenance including monitoring for the presence of a flame

Module 6 – Fischer-Tropsch and Product Upgrade

#### 4.8.2 Technically Infeasible Options – Nitrogen Oxides

Limiting the operating hours of the flare is technically infeasible. The duration and frequency of process upsets and emergencies cannot be anticipated.

The requirements of 40 CFR 60.18 apply to control devices that are used to achieve compliance with other applicable subparts of 40 CFR 60 and 61, as discussed above in Section 4.2.2. Because engineering details of the final flare design have not been developed at this time, the feasibility of adherence to the 40 CFR 60.18 guidelines can not be determined.

#### 4.8.3 Technology Ranking - Nitrogen Oxides

Good design and combustion practices are the only feasible control strategies that have been identified. Good combustion practice has historically been selected as BACT for NO<sub>x</sub> emissions from flares.

# 4.8.4 Evaluate Most Effective Controls - Nitrogen Oxides

A combination of good design and combustion practices is selected as BACT for  $NO_x$  emissions from the high pressure flare.

# 4.8.5 Proposed BACT Limits and Control Options - Nitrogen Oxides

The use of good design and good combustion practices has been selected as BACT for potential NOx emissions from the low pressure flare. The proposed BACT limit of 0.21 lb/MMBtu is based on the maximum hourly projected emissions (30.0 lb/hr) and the maximum flare heat input (146 MMBtu/hr).

#### 4.9 Low-Pressure Flare – Particulate Matter

The low pressure flare will be a source of particulate matter emissions. This section presents the BACT analysis for particulate matter emissions from the high pressure flare.

#### 4.9.1 Available Control Technologies – Particulate Matter

A search of RBLC for Process Type 19.3 - Flares, located several BACT determinations for particulate matter. In all cases, the BACT determinations referenced air assist with smokeless design and operation.

#### 4.9.2 Technically Infeasible Options - Particulate Matter

Smokeless design is technically feasible for particulate matter control from the low pressure flare.

Module 6 – Fischer-Tropsch and Product Upgrade

#### 4.9.3 Technology Ranking - Particulate Matter

Smokeless design is the only feasible control strategy that has been identified for particulate matter emissions from the low pressure flare.

# 4.9.4 Evaluate Most Effective Controls – Particulate Matter

Smokeless design has been selected as BACT for control of particulate matter emissions from the low pressure flare.

# 4.9.5 Proposed BACT Limits and Control Options - Particulate Matter

Smokeless design has been selected as BACT for potential particulate emissions from the high pressure flare. The proposed BACT limit of 0.02 lb/MMBtu is based on the projected emissions (2.3 lb/hr) and the maximum flare heat input (146 MMBtu/hr).

#### 4.10 Low-Pressure Flare - Sulfur Dioxide

The low pressure flare will be a negligible source of sulfur dioxide (SO<sub>2</sub>) emissions. This section presents the BACT analysis for SO<sub>2</sub> emissions from that source.

#### 4.10.1 Available Control Technologies - Sulfur Dioxide

Sulfur dioxide (SO<sub>2</sub>) emissions are due to combustion of sulfur present in fuel. The control of SO<sub>2</sub> emissions is most directly related to using low sulfur fuel. A review of the RBLC database for Process Type 19.3 - Flares, located BACT determinations for SO<sub>2</sub> as follow:

- Various fuel sulfur limits (%)
- Follow requirements of 40 CFR 60.18
- Good combustion practice
- Good design and proper operating practices, comply with 40 CFR 60.18
- Proper maintenance including monitoring for the presence of a flame

#### 4.10.2 Technically Infeasible Options – Sulfur Dioxide

It is technically infeasible to limit the sulfur content of gases vented to the high pressure flare to a specific sulfur percentage. However, the gases vented to the low pressure flare are not expected to contain sulfur compounds because the primary gas stream will be associated with regeneration of F-T catalyst beds which will contain negligible concentrations of sulfur compounds. As such, emission estimates for this process have been based on combustion of natural gas which has inherently low concentrations of sulfur compounds.

Module 6 – Fischer-Tropsch and Product Upgrade

As discussed above, because engineering details of the final flare design have not been developed at this time, the feasibility of adherence to the 40 CFR 60.18 guidelines can not be determined.

4.10.3 Technology Ranking - Sulfur Dioxide

Good combustion practices including good design of the flare and proper maintenance are determined to be the only feasible technologies for control of sulfur dioxide emissions from the low pressure flare.

4.10.4 Evaluate Most Effective Controls - Sulfur Dioxide

A combination of good design, good combustion practices, and proper maintenance is selected as BACT for SO<sub>2</sub> emissions from the low pressure flare.

4.10.5 Proposed BACT Limits and Control Options - Sulfur Dioxide

The use of good design and good combustion practices has been selected as BACT for potential SO<sub>2</sub> emissions from the low pressure flare. The proposed BACT limit of 0.001 lb/MMBtu is based on the maximum hourly projected emissions (0.2 lb/hr) and the maximum flare heat input (146 MMBtu/hr).

4.11 Equipment Leaks and Fugitives - Volatile Organic Compounds (VOC)

The final group of emission sources associated with this module is the collection of numerous valves, flanges, pumps, compressors, and other components that will be in contact with gaseous or light liquid service and may be subject to leaks.

4.11.1 Available Control Technologies - VOC

A review of the past 10 years of RBLC determinations located the following control technologies associated with BACT or other case-by-case determinations:

- Leakless/Sealless Components
- Leak Detection and Repair (LDAR) Program

#### 4.11.2 Technically Infeasible Options – VOC

Both of the above-listed technologies are feasible for control of fugitive VOC emissions from pumps, valves, and compressors used in the Fischer-Tropsch and Product Upgrade processes. However, leakless technologies are not technically feasible for threaded or bolted flanges. Welded or soldered flanges, while effectively leakless, would present operational complications

Module 6 – Fischer-Tropsch and Product Upgrade

that are considered to be technically infeasible. Therefore, leakless flanges will not be advanced for further evaluation.

#### 4.11.3 Technology Ranking - VOC

Table 4.11.3 Estimated VOC Control Technology Efficiencies for Equipment Leaks

Technology	Estimated Control Efficiency (%)	Basis
Leakless/Sealless Components	>99	EPA 453/R-95-017, November 1995, Table 5-1
LDAR (Valves – light liquid)	76*	EPA 453/R-95-017, November
LDAR (Pumps – light liquid)	68*	1995, Table 5-3

<sup>\*</sup>Monthly monitoring - 10,000 ppmv leak definition

# 4.11.4 Evaluate Most Effective Controls - VOC

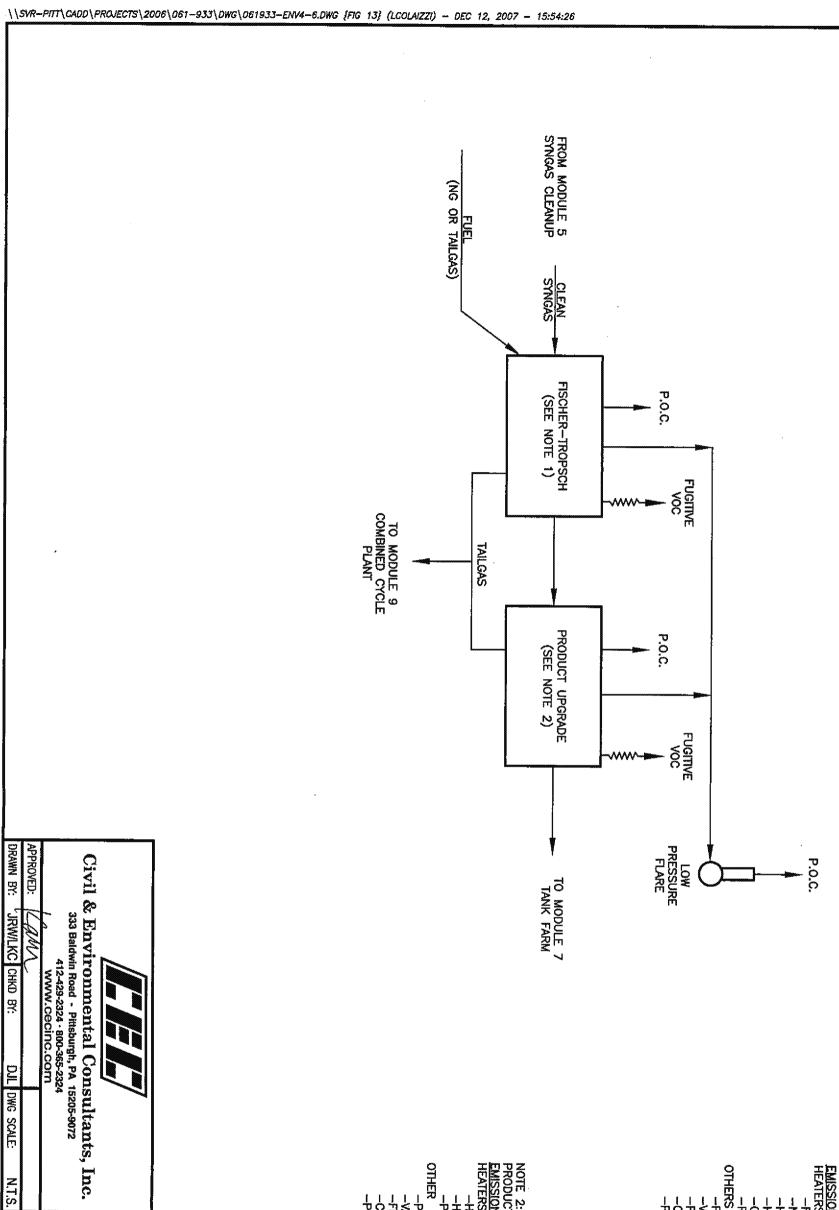
The most effective control for fugitive VOC emissions from pump, valve, and compressor leaks is expected to be the use of leakless/sealless or low-emission components. For flanges, the most effective control technology is determined to be implementation of an effective LDAR program.

# 4.11.5 Proposed BACT Limits and Control Options -VOC

The use of leakless/sealless or low-emission pumps, valves, and compressors has been selected as BACT for potential fugitive VOC emissions. For control of fugitive VOC emissions from flanges, ORCF will implement an ongoing LDAR program. The frequency of LDAR will be determined through compliance with applicable regulations. The proposed BACT limit for fugitive VOC emissions is shown below.

Proposed VOC Limit – Equipment Leaks: 1.7 tons per year

# ATTACHMENT 6A MODULE 6 FIGURES



		SUBMITTAL & REVISION RECORD
ŏ	DATE	DESCRIPTION
>	06/13/07	08/13/07 DRAFT SUBMISSION, AS: 061-933-FIGURE-15-MODULE-8-BLOCK-FLOW-DIAGRAM.dwg
œ.	12/17/07	12/17/07 AIR PERMIT APPLICATION

NOTE 1: FISCHER-TROPSCH EMISSION SOURCES HEATERS NOTE 2:
PRODUCT UPGRADE
EMISSION SOURCES
HEATERS
-HYDROCRACKER FEED OIL HEATER
-PRODUCTION FRACTIONATION FEED HEATER --PUMPS
--VALVES
--FLANGES
--COMPRESSORS
--PRESSURE RELEASE VALVES -PUMPS
-VALVES
-FLANGES
-COMPRESSORS
-PRESSURE RELEASE VALVES --FRACTIONATON FIRED HEATER
--NITROGEN HEATER
--HOT OIL HEATER
--HYDROGEN STRIPPING HEATER
--OXIDATION GAS HEATER
--REDUCTION GAS HEATER

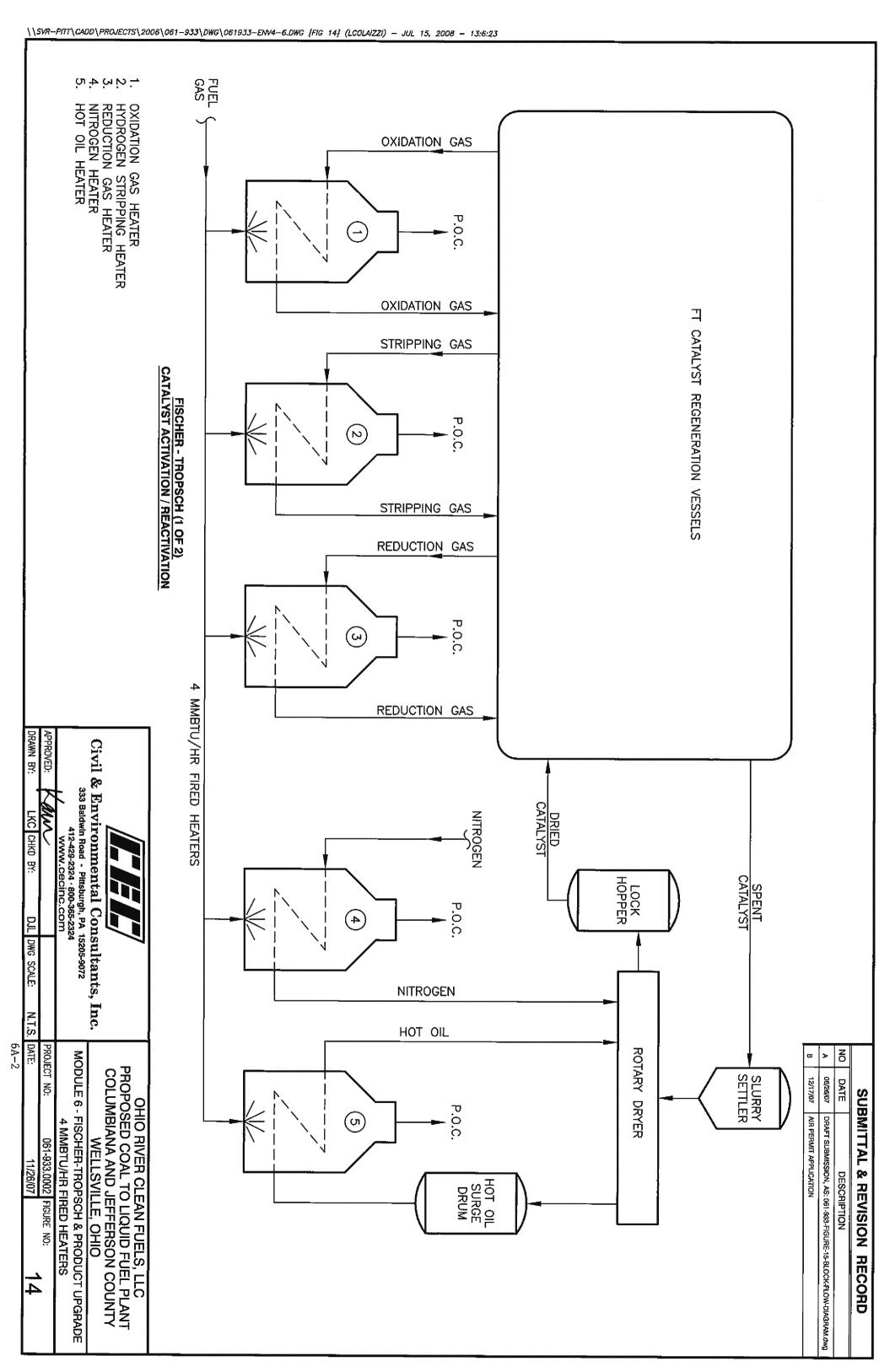
PROJECT NO:

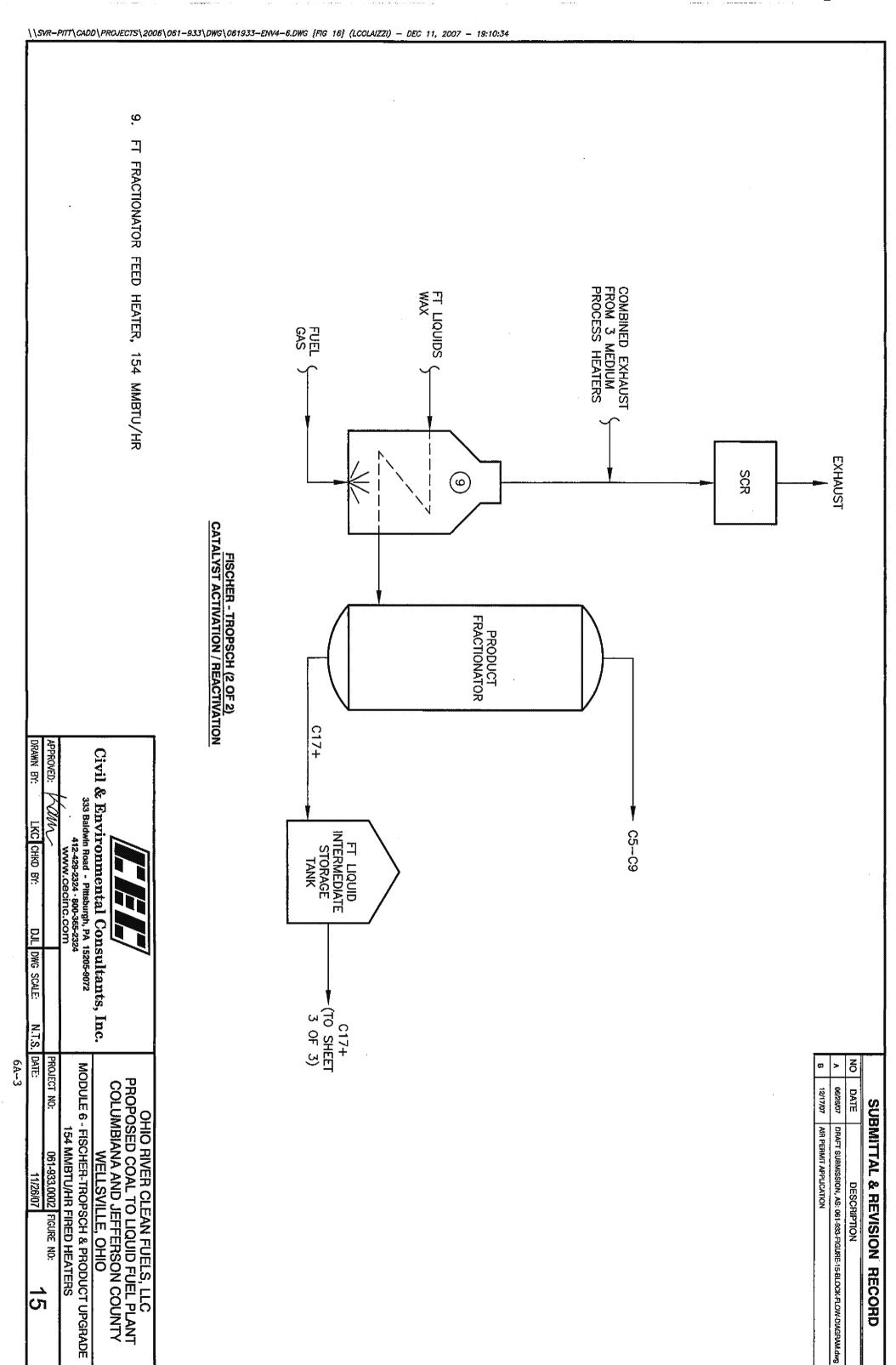
061-933.0002 FIGURE NO:

6A-1DATE

OHIO RIVER CLEAN FUELS, LLC PROPOSED COAL TO LIQUID FUEL PLANT COLUMBIANA AND JEFFERSON COUNTY WELLSVILLE, OHIO

FISCHER-TROPSCH & PRODUCT UPGRADE MODULE 6





### ATTACHMENT 6B MODULE 6 SUPPORTING CALCULATIONS

### Table 6B-I

Ohio River Clean Fuels, LLC

## Potential Emissions from the Process Heaters

			Pollutant	3		ДA		Š		F.		200	1	3	
Process Heaters		AP-42 EF (Sec. 1.4)	(Ib/MMscf)	84	T	0.0005		100	(Large)	7.6		0.0		5.5	
***************************************		Accounteration of the second o	***************************************				N. S. S. STORMAN, S. S. STORMAN, STORMAN, S.								
Assumptions												-			
487.5	Btu/scf - Tailgas HV														THE PERSON NAMED IN COLUMN
0.73	rired neater Emidency			8		P.		ž	- Š	PE		SO2		-     	
Unit	Heater Name	Design Duty MMBtu/hr	Est. Tailgas SCFH	tb/hr	ĝ	lb/hr	to,	lb/hr	to	lb/ħr	tb.	lb/hr	ta)	lb/hr	ğ
her-Tropsch	Fired Heater	154,0	434,359.0	1	159.8	0.0002	0.0010	121.62	532.7	3.30	14.5	0.26	H	2.39	10.
Fischer-Tropsch			11.282.1	•	4.2	0,000	0.0000	1.13	4.9	0.09	0.4	0.01	-	0.06	0.3
Fischer-Tropsch		4.0	11.282.1	1	2	0,0000	0,0000	1.13	4.9	0.09	0.4	0.01	-	90.0	0.3
her-Tronsch	ning Heater		11 282 1	Î	4 2	0.0000	0.0000	1.13	4.9	0.09	0.4	0.01	┡	0.06	0.3
Fischer-Transch	Ovidation Gas Heater		11 282 1	t	4.2	00000	0.0000	1.13	4.9	60.0	4.0	0.01	╀	90.0	0.3
Fischer, Tropech			11 282 1	1	42	00000	0.000.0	1.13	4.9	60 0	4.0	0.01	┡	0.06	0.3
100000000000000000000000000000000000000	1	210	20 020 p	Ť	ς α	00000	0.0001	5 02	25.0	0.45	200	0.04	╀	33	1 4
	T	520	0,500,0	Ť	5 0	2000	2000	200	27.50	2 5	210	000	╀	2 6	
Product Opgrade	Drading Croston for Logical	27.0	50.410.3 87 800 9	1	0 0 0	00000	2000	6 77	20.6	2 2 0	5 6	300	- 00	2,00	. c
rioduci Opgrade	7	040	01,032.3	T	24.0	0.0000	2000	200	243.0	5	20.2	5 6	+	2 4 6	2 2
	Total (Large and Medium)	2000	5 440 3		20.00	0.0	0.0	140.0	24.7	. F	1.07	* C	2,0		12.5
	Otal (Otalan)	7.07	2:21	F	3		2	25			2	2	-		
III Process He	Small Process Heaters (4 MMBtu/hr) -Calculations are for single unit	r single unit				Mediuma	Medium and Large Process Heaters	ocess Heat	ers				ļ	<del> </del>	
**************************************					-			:							
HAPs	s (Ib/MMscf)	lb/hr	tpy			HAPs	(lb/MMscf)	lb/hr	tpy						
Total POM		9.93E-07	4,35E-06			Total POM		5.44E-05	2.38E-04						
penzene	e 2,10E-03	2,37E-05	1.04E-04		-	penzene		1.30E-03	5.68E-03						
dichlorobenzene		1.35E-05	5.93E-05			dichlorobenzene!		7,41E-04	3.25E-03				-		
formaldehyde		8.46E-04	3.71E-03			formaldehyde	7.50E-02	4.63E-02	2.03E-01						
hexane		2.03E-02	8.89E-02			hexane		1.11E+00	4.87E+00				-		
naphthalene		6.88E-06	3.01E-05			naphthalenel		3.77E-04	1.65E-03				_		
toluene		3.84E-05	1.68E-04			toluene	3,40E-03	2.10E-03	9.20E-03						
arsenic		2.26E-06	9.88E-06			arsenic	2.00E-04	1.24E-04	5.41E-04						
beryllium		1.35E-07	5.93E-07		-	peryllinm	1.20E-05	7.41E-06	3.25E-05						
cadmium		1.24E-05	5.44E-05			cadmium	1.10E-03	6.79E-04	2.98E-03						
chromium		1.58E-05	6.92E-05			chromium)		8.65E-04	3.79E-03						
cobalt		9,48E-07	4.15E-06			cobalt		5.19E-05	2.27E-04						
manganese	3,80E-04	4,29E-06	1.88E-05			manganese		2.35E-04	1.03E-03		-				
mercury	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2.93E-06	1.28E-05			mercury	2.60E-04	1.61E-04	7.03E-04						
nicke	2,10E-03	2.37E-05	1.04E-04			nickel	:	1.30E-03	5.68E-03						
selenium		2.71E-07	1.19E-06			selenium	:	1.48E-05	6.49E-05						
Total HAPs		0.02	0.09			Total HAPs	1 1	1.17	5.11						
Notes	Notes: 1. Factors from Table 1.4-1, Emission Factors for Nitrogen Oxides (	actors for Nitr	ogen Oxides (	NO <sub>x</sub> ) and	Carbon	VOx) and Carbon Monoxide (CO) from Natural Gas Combustion (used for CO & NOx).	rom Natural	Gas Combu	stion (used	for CO & N(	Ġ.				
	2. Factors from Table 1.4-2, Emission Factors for Criteria Pollutants	actors for Crit	eria Pollutants		and Greenhouse	Sases from Natural	ural Gas Con	Gas Combustion (used for Pb,	ed for Pb, F	PE, SO <sub>2</sub> , & V	& VOC).				
	3. Catalyst Regeneration Fired Heaters Operate < 50 % Duty Cycle.	Operate < 50	% Duty Cycle	. Calculations	tions are	s at 100 %.									
	4. Operating Year =	365	Days										-		
	R Divod Hoster Efficiency includes 10% Expess Bired Moster Duty	Evapor Fired	Hoster Duty	_	_					_	_	_		-	
	10. I add treated Chicagoly mondes 10.76		200	_	_					_			_		

December 2007 Revision 1, July 2008

### Table 6B-2

Ohio River Clean Fuels, LLC

## Actual Emissions from the Process Heaters

Module 6 - Fische	Module 6 - Fischer-Tropsch & Product Upgrade	-	Pollutant	8		4		χΟχ		PE		802		Voc	Γ
		AP-42 EF	빏	84		0.0005		280	(Large)	7.6		0.6		5.5	
Process Heaters		(Sec. 1.4)	(lb/MMscf)			2000	xuuniuuuuuutuuuuuuuuuu	100		2		2		2	
Assumptions	Divinof Tollana UM														
0.73	Fired Heater Efficiency		:												
88	Assumed % control efficiency for NO <sub>x</sub> emissions from he	nissions from	heaters with design duties	lesign du		≥20 MMBtu/hr (control	I via ultra-low	NO <sub>x</sub> bun	rs & selectiv	selective catalytic reduction)	reduction				
				8		P.		2	χŎχ	H		S02		9	
Unit		Design Duty MMBtu/hr	Est. Tallgas	lb/hr	ģ	lb/hr	ţρ	lb/hr	tby	lb/hr	ğ	ıp/hr	 ģ		ģ
Fischer-Tropsch	-	154.0	434,359.0		159.8	2.2E-04	9.5E-04		63.9	3.30	14.5	0.3	1.1	┰	10.5
Fischer-Tropsch	<u>;                                    </u>	4.0	11,282.1	6	4.2	5,6E-06	2.5E-05		4.9	0.09	4.0	0.0	0.0	0.1	0.3
Fischer-Tropsch	<del></del>	4.0	11,282.1	3	4.2	5.6E-06	2.5E-05	1.1	4.9	0.09	0.4	0.0	0.0	T	0.3
Fischer-Tropsch	<u> </u>	4.0	11,282.1	:	4.2	5.6E-06	2.5E-05		4.9	0.09	0.4	0,0	0.0	T	0.3
Fischer-Tropsch	•	4.0	11,282.1	:	4.2	5.6E-06	2.5E-05		4.9	0.09	0.4	0.0	0.0	T	0.3
Fischer-Tropsch	Reduction Gas Heater	4.0	11,282.1		2,7	5.6E-06	2.5E-05		4.9	0.09	0.4	0.0	0.0	T	0.3
Product Upgrade	Hydrocracker Feed Oil Heater	21.0	59,230.8	: :	21.8	3.0E-05	1.35-04	0.7	3.1	0.45	2.0	0.0	0.2	T	1.4
Product Upgrade	Hydrocracker Feed Hydrogen Heater	20.0	56,410.3	: :	20.8	2.8E-05	1.2E-04		3.0	0.43	1.9	0.0	0.1		1,4
Product Upgrade	-	24.0	67,692.3		24.9	3.4E-05	1.5E-04		3.6	0.51	2.3	0.0	0.5		9.
	Total (Large and Medium)	219.0	617,692.3	اہا	227.3	3.1E-04	1.4E-03	Ì	73.6	4.7	20.7	0.4	1.6	3,4	14.9
	Total (Small)	20.0	56,410.3	4.7	20.8	2.8E-05	1.2E-04	5.6	24.7	0.4	1.9	0.0	0.1	0.3	1.4
Omall December Ho	Small Decrees Hearthan (A MM Bridge) Calculations and Account				ĺ			Joseph Control							
Stildii FIOCESS DE	diels (4 mmcturiii) -Calculdions are to	alligie urig			-	Medicina	ano Large Fr	riocess neaters	ers				-	+	T
		on control)				Actual Em	Actual Emissions (no add-on control)	dd-on cont					-		
HAPS	(ID/MIMSCI)	lb/hr	ód			HAPS		lb/hr						1	
Total POM	8.80E-05	9.93E-07	4.35E-06			Total POM		5.44E-05	(V)						
penzene	2,10E-03	2.37E-05	1.04E-04		İ	euazuag		1.30E-03							
dichioropenzen	1,205-03	1.35E-05	5.93E-05		Ì	dichlorobenzene		7.41E-04	(7)					1	T
rormaldenyde	7.50E-02	8.40H-04	0.000.00		Ì	Tormaidenyde	7.50E-02	4.635-02	N:T						
piloxalia	00.F300.1	20-02-02	0.030-02		Ť	ecesaria ecesaria	1.00E+00	775	₹;°						T
010101101	2 40E-04	9 84E-06	3.0.15			180186186136	2 20 00 0	40.00	- ; '				-		T
DI D	20-1104-5	2 265 76	- 100E-04		Ť	Colocile	0.400	4 24F 24	"						T
Series of	4 200 05	1 255 07	3.00E-00		Ť	OI DE CO	4 2000 4	7 44 0 00	010				-		T
	1 400-03	1 2/10 05	77-07		Ť	UNIIO E	270107	7.4 100 100 100 100 100 100 100 100 100 10							
	4 40 00	20-11-01-1	200		Ť	Cadimon	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	0.00	Y   C				-		T
= = = = = = = = = = = = = = = = = = =	AOE-05	0 48E-07	4 155-05		Ť	TING S	2 40 mov	0.00 R	310					ŀ	
4840460460	3 801.04	4 29E-06	1 88F.05		Ť	100000000000000000000000000000000000000	2 10 H	2,250	u į m				1	T	T
Mercus		2 93E-06	1.28E-05		Ī	Signature	2 BDF.04	1815.04				T	+		T
nickel	2	2.37E-05	1.04E-04			nickel	2.10E-03	1 30E-03	. (()			ľ	-	-	Ī
muideles	2.40E-05	2.71E-07	1.19E-06	:	İ		2.40E-05	1.48E-05						-	T
Total HAPs		0.02	60'0			Total HAPs		1.17	$\square$						
						3 (00)				0			+	1	
Notes:		actors for Mitro	) sepixo ueb	NC <sub>x</sub> ) and	Carbon	Monoxide (CO) fro	om Natural G	as Combus	tion (used to	S CO & NC	,x)				
	2. Factors from Table 1.4-2, Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion (used for Pb, PE,	actors for Crite	ria Pollutants	and Gre	euhouse	Gases from Natur	al Gas Comb	nstion (use	ed for Pb, PE	SO <sub>2</sub>	& VOC).				
	3. Catalyst Regeneration Fired Heaters Operate < 50 %	Operate < 50 °	% Duty Cycle,		lions are	Calculations are at 100 %.							<u> </u>		
	4. Operating Year ≕	365	Days												
	5. Fired Heater Efficiency includes 10% Excess Fired He	Excess Fired I	leater Duty.												
	6. Emissions are calculated using mixed tailgas from PSA, F-T and Product Upgrade.	tailgas from P	SA, F-T and	Product (	lpgrade.										
	7. Emissions from the heaters with design duties of 4.0 l	n duties of 4.0	MMBtu/hr ar	e contro	ed via go	//MBtu/hr are controlled via good combustion practices, good	actices, good	design, operation,	eration, and	l engineering practices	g practice	3S.			
	8. See BACT analysis for further details regarding the se	regarding the	selection of control technologies	ontrol tec	hnologie	9.	7 6 40 AD 4 . A. L.						1	+	T
	9. Corninon ducting for control of NOX is assumed for me	assumen or	Deginin and i	arge proc	925 Near	adium and large process nearers (all nearers > 4	4 MIMIBTU/NI).						-	1	7

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### **Supporting Calculations**

### Low Pressure Flare Pilot Burner Emissions

### Assumptions

0.55 MMBtu/hr HHV of tailgas for pilot burners

0.001 MMscfh of tailgas for pilot burners

98 % flare destruction efficiency of VOC emissions

487.5 Btu/scf - assumed LHV of tailgas

### **Emissions Calculations**

AP-42 Section 1.4 (Natural Gas Combustion) emission factors have been used below to estimate emissions from tailgas combustion in the pilot flame burner. This burner is assumed to operate 8,760 hr/yr.

		Actual E	missions	Potential B	Emissions
_	Emission Factor	(Cont	rolled)	(Uncon	trolled)
Pollutant	(lb/MMscf)	lb/hr	tpy	lb/hr	tpy
Carbon Monoxide	84	0.09	0.42	0.09	0.42
Sulfur Dioxide	0.6	0.00	0.00	0.00	0.00
Nitrogen Oxides	100	0.11	0.49	0.11	0.49
Lead	0.0005	0.00	0.00	0.00	0.00
PE and PM10	7.6	0.01	0.04	0.01	0.04
VOC	5.5	0.01	0.03	0.01	0.03
HAPs					
Total POM	8.80E-05	9.93E-08	4.35E-07	9.93E-08	4.35E-07
benzene	2.10E-03	2.37E-06	1.04E-05	2.37E-06	1.04E-05
dichlorobenzene	1.20E-03	1.35E-06	5.93E-06	1.35E-06	5.93E-06
formaldehyde	7.50E-02	8.46E-05	3.71E-04	8.46E-05	3.71E-04
hexane	1.80E+00	2.03E-03	8.89E-03	2.03E-03	8.89E-03
naphthalene	6.10E-04	6.88E-07	3.01E-06	6.88E-07	3.01E-06
toluene	3.40E-03	3.84E-06	1.68E-05	3.84E-06	1.68E-05
arsenic	2.00E-04	2.26E-07	9.88E-07	2.26E-07	9.88E-07
beryllium	1.20E-05	1.35E-08	5.93E-08	1.35E-08	5.93E-08
cadmium	1.10E-03	1.24E-06	5.44E-06	1.24E-06	5.44E-06
chromium	1.40E-03	1.58E-06	6.92E-06	1.58E-06	6.92E-06
cobalt	8.40E-05	9.48E-08	4.15E-07	9.48E-08	4.15E-07
manganese	3.80E-04	4.29E-07	1.88E-06	4.29E-07	1.88E-06
mercury	2.60E-04	2.93E-07	1.28E-06	2.93E-07	1.28E-06
nickel	2.10E-03	2.37E-06	1.04E-05	2.37E-06	1.04E-05
selenium	2.40E-05	2.71E-08	1.19E-07	2.71E-08	1.19E-07
Total HAPs		2.13E-03	9.33E-03	2.13E-03	9.33E-03

### **Supporting Calculations**

### **Low Pressure Flare Emissions**

### Assumptions

- 7.17 MMscfd low-Btu fuel gas sent to low pressure flare on continuous basis
- 0.30 MMscfh low-Btu fuel gas sent to low pressure flare on continuous basis
- 145.7 MMBtu/hr heat input from F-T catalyst regeneration and other process vents
  - 98 % flare destruction efficiency of VOC emissions

Potential VOC emissions are uncontrolled.

Actual emissions of VOC assume 98% destruction efficiency of the flare, no other controls apply.

### **Emissions Calculations**

Flare emission factors are based on combustion of natural gas (AP-42 Section 1.4)

Annual average (lb/hr) emission estimates assume that the total annual emissions occur continously for 8,760 hr/yr.

		Actual E	missions	Potential I	Emissions
	Emission Factor	1	rolled)		itrolled)
Pollutant	(lb/MMscf)	lb/hr	tpy	ib/hr	tpy
Carbon Monoxide	84	25.1	109.9	25.1	109.9
Sulfur Dioxide	0.6	0.2	0.8	0.2	0.8
Nitrogen Oxides	100	29.9	130.9	29.9	130.9
Lead	0.0005	0.0	0.0	0.0	0.0
PE and PM10	7.6	2.3	9.9	2.3	9.9
VOC	5.5	0.0	0.1	1.6	7.2
***************************************		***************************************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	***************************************	
HAPs	***************************************		*********************	*******************************	18-20-2071141011020-111-111-111011
Total POM	8.80 <b>E</b> -05	5.26E-07	2.30E-06	2.63E-05	1.15 <b>E</b> -04
benzene	2.10E-03	1.25E-05	5.50E <b>-</b> 05	6.27E-04	2.75E-03
dichlorobenzene	1.20E-03	7.17E-06	3.14E-05	3.59E-04	1.57E-03
formaldehyde	7.50E-02	4.48E-04	1.96E-03	2.24E-02	9.82E-02
hexane	1.80E+00	1.08E-02	4.71E-02	5.38E-01	2.36E+00
naphthalene	6.10E-04	3.65E-06	1.60E-05	1.82E-04	7.98E-04
toluene	3.40E-03	2.03E-05	8.90E-05	1.02E-03	4.45E-03
arsenic	2.00E-04	5.98E-05	2.62E-04	5.98E-05	2.62E-04
beryllium	1.20E-05	3.59E-06	1.57E-05	3.59E-06	1.57E-05
cadmium	1.10E-03	3.29E-04	1.44E-03	3.29E-04	1.44E-03
chromium	1.40E-03	4.18E-04	1.83E-03	4.18E-04	1.83E-03
cobalt	8.40E-05	2.51E-05	1.10E-04	2.51E-05	1.10E-04
, manganese	3.80E-04	1.14E-04	4.97E-04	1.14E-04	4.97E-04
mercury	2.60E-04	7.77E-05	3.40E-04	7.77E-05	3.40E-04
nickel	2.10E-03	6.27E-04	2.75E-03	6.27E-04	2.75E-03
selenium	2.40E-05	7.17E-06	3.14E-05	7.17E-06	3.14 <b>E</b> -05
Total HAPs		1.29E-02	5.65E-02	5.64E-01	2.47E+00

### **Supporting Calculations**

### Summary: Combined Actual and Potential Low Pressure Flare Emissions

Pilot Burner and Low Pressure Flare Venting Emissions (Combined) Combined heat input to low pressure flare is estimated at 146 MMBtu/hr

	3	missions		Emissions
· · · · · · · · · · · · · · · · · · ·	<del>}</del>	rolled)		trolled)
Pollutant	lb/hr	tpy	lb/hr	tpy
Carbon Monoxide	25.2	110.3	25.2	110.3
Sulfur Dioxide	0.2	0.8	0.2	0.8
Nitrogen Oxides	30.0	131.4	30.0	131.4
Lead PE and PM10	0.0	0.0	0.0	0.0
PE and PM10	2.3	10.0	2.3	10.0
VOC	3.3E-02	0.1	1.6	7.2
	***************************************		*******************************	
HAPs	***************************************		***************************************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Total POM	6.25E-07	2.74E-06	2.64E-05	1.16E-04
benzene	1.49E-05	6.53E-05	6.30E-04	2.76E-03
dichlorobenzene	8.52E-06	3.73E-05	3.60E-04	1.58E-03
formaldehyde	5.33E-04	2.33E-03	2.25E-02	9.85E-02
hexane	1.28E-02	5.60E-02	5.40E-01	2.36E+00
naphthalene	4.33E-06	1.90E-05	1.83E-04	8.01 <b>E</b> -04
toluene	2.42E-05	1.06E-04	1.02E-03	4.47E-03
arsenic	6.00E-05	2.63E-04	6.00E-05	2.63 <b>E</b> -04
beryllium	3.60E-06	1.58E-05	3.60E-06	1.58E-05
cadmium	3.30E-04	1.45E-03	3.30E-04	1.45 <b>E</b> -03
chromium	4.20E-04	1.84E-03	4.20E-04	1.84E-03
cobalt	2.52E-05	1.10E-04	2.52E-05	1.10 <b>E</b> -04
manganese	1.14E-04	4.99E-04	1. <b>14</b> E-04	4.99E-04
mercury	7.80E-05	3.42E-04	7.80E-05	3.42E-04
nickel	6.30E-04	2.76E-03	6.30E-04	2.76E-03
selenium	7.20E-06	3.15E-05	7.20E-06	3.15E-05
Total HAPs	1.50E-02	6.59E-02	5.66E-01	2.48E+00

### ATTACHMENT 6C MODULE 6 DOCUMENTATION

Module 6 – Fischer-Tropsch and Product Upgrade

### LIST OF REFERENCES

- U.S. EPA, AP-42 Section 1.4 Natural gas Combustion, July 1998.
- U.S. EPA, Air Pollution Control Technology Fact Sheet Catalytic Incinerator (EPA-452/F-03-018).
- U.S. EPA, Air Pollution Control Technology Fact Sheet Fabric Filter Reverse Air-Cleaned Type, (EPA-452/F-03-026).
- U.S. EPA, Air Pollution Control Technology Fact Sheet Packed Bed/Packed Tower Scrubber (EPA-452/F-03-015).
- U.S. EPA, Air Pollution Control Technology Fact Sheet Selective Catalytic Reduction (EPA-452/F-03-032).
- U.S. EPA, Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017), November, 1995.
- U.S. EPA, RACT/BACT/LAER Clearinghouse (RBLC); website: <a href="http://cfpub.epa.gov/RBLC">http://cfpub.epa.gov/RBLC</a>

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1987 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

				***************************************				***************************************				
RBLCID	FACILITYNAME	PROCESSNAME	THEU	THAUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISCIMIT1AVG TIMECONDITION	MISS	STOUNIT A	STDLIMIT AVGTIME CONDITION
OK-0102	OK-0102 PONCA CITY REFINERY	PROCESS HEATERS AND BOILERS.			Process heaters H-1001, H- 9901, H-9902, USLD-5/5a, NH-6007, H-6014, H-6015, H- 5001, H-0057, H-0069, and H- 0059, and steam bollers B- 0009 and B-0010. Maximum heat rate ranges from 12 mmBluth D-241 mmBluth. Ultra low NOX burners.	ULTRA LOW NOX BURNERS REQUIRED BY CONSENT DECREE, BACT IS GOOD COMBUSTION PHACTICE.		0.04 LBAMBITU		i <b>!</b>	E	
LA-0114 S	ST. JAMES STYRENE PLANT	SUPERHEATER	165	165 MMBTU/H		PROPER OPERATING TECHNIQUES WITH AUTOMATIC CONTROLS% EXCESS 02	0.04	0.04 L B/MMBTLI		40.0	1 I BANNATI I	
AZ-0046 AI	ARIZONA CLEAN FUELS YUMA	VACUUM CRUDE CHARGE HEATER	105		_		90.0	LB/WMBTU	THREE-HOUR	8	BAMAKETT!	
AZ-0046 A	ARIZONA CLEAN FUELS YUMA	HYDROGRACKER UNIT MAIN FRACTIONATOR HEATER	211		THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 10500		0.04	LB/MMBTU	THREE-HOUR	20	0.04 I B/MMBTI I	
AZ-0046 AF	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 1	192	92 MMBTU/H	THIS EQUIPMENT IDENTIFIED BY EQUIPMENT ID # 8-05120		0.04	L8/MMBTU	0.04 LB/MMBTU 3-HR AVERAGE	0.041	0.04-LB/MMBTU	
AZ-0046 Af	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 2	129	имвти/н	THIS EQUIPMENT IS 129 MMBTU/H IDENTIFIED BY ID# 8-05130		0.04	LB/MMBTU	0.04 LE/MMBTU 3-HR AVERAGE	0.04	0.04 LB/MMBTU	
AZ-0046 AF	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER SPLITTER REBOILER	`	WIMBTU/H	THIS EQUIPMENT THIS EQUIPMENT THIS EQUIPMENT THIS EQUIPMENT THIS EQUIPMENT		0.04	LB/MMBTU	0.04 LB/MMBTU 3-HR AVERAGE	0.04 1	0.04 LB/MMBTU	
AK-0037 KE	KENAI REFINERY	CRUDE HEATER, H101A	140	INSTALLS THEREPE THEOUIRE WITH TH DESIGN ( 1400 MM AUTHORN CAPACIT FUELS A GAS, REF GAS, REF GAS, REF GAS, REF GAS, REF GAS, REF CAPACIT SOURCE COMBINA GAS, ANTHORN RETROLE REFOLE REFO	ED PRIOR TO 1975, JRE NOT TO COMPLY E PSD PROGRAM. SAPACITY OF BATED Y IS 1 MMBTU/H. RE NATURAL INDEX OAS AND INDICATION IS 10 AS TO WHICH AIMMARY FUEL. SAPACITY IS 165.0 AS TO WHICH SHOUND IS 100.0 OF Y GS. NATURAL Y GAS. NATURAL SUITON OF Y GAS. NATURAL Y GAS. NATURAL Y GAS. NATURAL SUITON OF Y GAS. NATURAL Y GAS. NATURAL Y GAS. NATURAL SUITON OF Y GAS. NATURAL Y GAS. NATURAL Y GAS. NATURAL SUITON OF Y GAS. NATURAL Y GAS	NONE INDICATED.	0.0	LEAMMETU		0.04	LB/MMBTU	
CEC,	933.0002				C-2	מל וייסומין דים		O'CA LEVININE I O		A A	December 2007	2007

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/192007
And Process Type Contains "12.3"; Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gascous Fuel & Gascous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

	-										
RBLCID	FAGILITYNAME	PROCESSNAME	THRU	THRU THRUPUT PUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT EMISLIMIT1AVG MISS STDUNIT TIMECONDITION LIMIT ELIMIT	STDE MISS STDUNI LIMIT LIMIT	STDLIMIT T AVGTIME CONDITION
AZ-0046	AZ-0046 ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT CHARGE HEATER	,	THIS L BY EQ 122 MMBTU/H 05110	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # 8- 05110		0.04	LB/MMBTU	0.04 LB/MMBTU 3-HR AVERAGE		
AZ-0046	AZ-0046 AHIZONA CLEAN FUELS YUMA	BUTANE CONVERSION UNIT ISOSTRIPPER REBOILER	222	MM8TU/H	THIS EQUIPMENT 222 MM8TU/H IDENTIFIED BY ID # B-15110	- :	0.0	LB/MMBTU	0.04 LB/MMBTU 3-HR AVERAGE		NOT AVAILABLE
					6-81: 135 MM BTU/HR 2005- 14: 195 MM BTU/HR 2005-						
					17: 159 MM BTU/HR 2005- 18: 231 MM BTU/HR 2005-						
					29: 195 MM BTU/HR 2005- 32: 159 MM BTU/HR 2005-	PROPER EQUIPMENT DESIGN AND OPERATION.					
		REBOILER 2005-18 & HEATERS F-15-02	7100000		37: 173 MM BTU/HR	GOOD COMBUSTION					
-LA-0213	*LA-0213 ST. CHARLES REFINERY	(6-81), 2005-14, 2005-17, 2005-29, 2005- 32, & 2005-37	00000-000		SOURCES ALSO FIRE NATURAL GAS.	PRACTICES, AND USE OF GASEOUS FILELS	5	BAMMBTII	HOURLY OUR RAMMETT AVERAGE		
						ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN,					
		HEATER, CRUDE VACUUM UNIT FEED			HEATER BURNS NATURAL GAS AND REFINERY OFF	USING GASEOUS FUEL, PROPER OPERATING			HOURLY		
LA-0119	LA-0119 LAKE CHAHLES HEFINEHY	(H-20002)	150	50 MMBTU/H GAS	GAS.	TECHNIQUES.	8	3 L8/H°	MAXIMUM		
TX-0395	DIAMOND SHAMBOCK MCKEE PLANT	NO 1 INTERHEATER	147.2	147.2 MMBTU/H	:		4.13 LB/H	H/8/H		0.03 LB/MMB	0.03 LB/MMBTU CALCULATED
	-				UNIT BURNS NATURAL	ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN,					
					GAS AND REFINERY OFF GAS, FORMERLY	USE GASEOUS FUEL,		-	> iai iOH		C01-6
LA-0119	LA-0119 LAKE CHARLES REFINERY	HEATER, NO. 4 CTU (H-4050)	237	MMBTU/H	237 MMBTU/H IDENTIFIED AS H-40001	TECHNIQUES	4.7	4.7 LB/H*	MAXIMUM	0.02 LB/MMB	0.02 LB/MMBTU BY CATC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/19/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Poliutant: Carbon Monoxide

		*************					
STDLIMIT AVGTIME CONDITION			Calculated using heat	LB/MMBTU CALCULATED	Calculated based on heat	0.082 LB/MMBTU CALCULATED	r 2007
STDUNIT	-	0.03 LB/MMBTU	LB/MMBTU	LB/MMBTU	0.063 LB/MAMBTU	LB/MMBTU	December 2007
STDE MISS LIMIT		0.03	0.07	0.082	0.063	0.082	_
AVG							
STDE EMISLIMITIAVG MISS TIMECONDITION LIMIT							
EMISLIMIT 1UNIT	H/87	H/81	8.28 LB/H	8.6 LB/H	9.27 LB/H	10 LB/H	
EMIS LIMIT1		6.95	8.28	8,6	9.27	10	
ETRLDESC L			GOOD COMBUSTION PRACTICE	NONE INDICATED	BACT AND BAT REMAIN AS GOOD COMBUSTION PRACTICES	NONE INDICATED	
PROCESSNOTES	CRGANIC NITROGEN AND SULFUR FROM THE FEED STREAD MIXED WITH HYDROGEN IN HEATED, AND FED TO A REACTON CONVERTS THE CREAD SULFUR TO HYDROGEN SULFUR TO HYDROGEN SULFUR TO CAMPOUNDS TO AMMONIA. THE EFFLUENT STREAM BY THE EFFLUENT STREAM BY THE EFFLUENT STREAM BY AN AMINE ABSORBER AND ROUTED TO THE SRU, NEW EQUIPMENT UNDER HYDROGEN STREAM BY AN AMINE ABSORBER AND ROUTED TO THE SRU, NEW EQUIPMENT UNDER THE AMENDAMENT UNDER THE AMENDAMENT UNDER HYDROGEN STREAM BY AN AMINE ABSORBER AND RECTOR, ADDITIONAL REACTOR ADDITIONAL REACTOR ADDITIONAL REACTOR ADDITIONAL HYDROGEN PURIFICATION MEMBRANE AND AN AND AND AND AND AND AND AND AND		The unit is subject to the NSPS 40 CFR Subpart J, Subpart GG, Subpart QGQ. The unit is also subject to MACT standards in 40 CFR ed Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	EMISSION POINT NO. BTU- HF106.	The north crude heater was modified by installing low NOx burners. The reduction of NOx emissions reduces the overall increase below significant levels allowing the project to net out* of NSR and PSD for NOX.*	EMISSION POINT NO. BTU- HF103.	6C-4
THRUPUT	SS MMBTU/H	248 MMBTU/H	116 MMBTU/H	104.25 MMBTU/H	147 MMBTU/H	121.74 MMBTU/H	
THAU	85	248	116	104.25	147	121.74	l
PHOCESSNAME	MIXED DISTILLATE HYDROHEATER REBOILER HEATER	NO. 1 REFORMER CHARGE HEATER	DELAYED COKER UNIT, HEATER	LYONDELL - CITGO REFINING, LP ISOM II WEST REACTOR FEED HEATER	NORTH CRUDE HEATER	- CITGO REFINING, LP BTU-NO. 1 REACTOR FEED HEATER	
D FACILITYNAME	CITGO CORPUS CHRISTI REFINERY - WEST PLANT	DIAMOND SHAMROCK MCKEE PLANT	UNITED REFINERY CO.		UNITED REFINERY CO.	LYONDELL	CEC, Inc. 061-933.0002
RBLCID	TX-0478	TX-0395	PA-0231	TX-0375	PA-0231	TX-0375	ŭ

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 1/1/2/2007
And Process Type Contains "12,3"; Industrial-Size Boilers/Furnaces (more than 100 million Btw/H, up to/including 250 million Btw/H); Gascous Fuel & Gascous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

					בייים מולטון אוטווסאום						
RBLCID	FACILITYNAME	PROCESSNAME	THAU	THRUPUT UNIT	PHOCESSNOTES		EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS STDUNIT LIMIT LIMIT	STDLIMIT AVGTIME CONDITION
LA-0193	STYRENE MONOMER PLANT	BZ RECOVERY COLUMN HEATER HS. 2103	182.1	182.1 MMBTU/H		GOOD COMBUSTION PRACTICES - GOOD EQUIMMENT DESIGN, USE OF GASEOUS FUELS FOR GOOD MIXING, AND PROPER COMBUSTION TECHNIQUES	15	15 LB/H	HOURLY MAXIMUM	0.08 LEMMETU	ANNUAL AVERAGE
LA-0193	STYRENE MONOMER PLANT	REHEATER HS-8220	195	95 MMBTUH	ESS	GOOD COMBUSTION PRACTICES - GOOD EQUIPMENT DESIGN, USE OF GASEOUS FUELS FOR GOOD MIXING, AND PROPER COMBUSTION TECHNIQUES	6.	LB/H	HOURLY MAXIMUM	0.08 LEVMM81	ANNUAL LBMMBTU AVERAGE
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE II HEATER	228.42	42 MMBTU/H	EMISSION POINT NO.	NOME INDICATED	18.6 LB/H	.B/H		0.082 LB/MMBT	0.082 LB/MMBTU CALCULATED
TX-0375 TX-0442	LYONDELL - CITGO REFINING, LP SHELL OIL DEER PARK	BOILER NO. 12 TWENTY ONE FURNACES	245	245 MMBTU/H	EMISSION PT NO: BOILER- 12. SHALL BE SHUTDOWN. I	NONE INDICATED	20.2 LB/H 500 PPM	20.2 LB/H 500 PPMV		0.08 LB/MMBT	0.08 LB/MMBTU CALCULATED
TX-0442	SHELL OIL DEER PARK	ОНТ Н2 НЕАТЕР				DOLL	200	500 PPMV			
ለ 11 21	PR XX AIR	HEATER OTHER PROCESS.		Harris A. A. A. A. A. A. A. A. A. A. A. A. A.	CORPOGESING CORPORATION, TYPE: HYDROGGEN REFORMER, MODEL: LH 1207 BOO1, FUNC EQUIP: PROVIDES HEAT TO CATYST FILLED TUBES TO PRODUCE HYDROGEN-, FUEL_TYPE: NATURAL GAS (WARM UP AND SUPPLEMENT), SCHEDULE: CONTINUOUS, H/D: 24, DW; 7, W/Y: 52, NOTES: AMMONIA IS MIXED INTO RUE GAS, AND THE MIXTURE IS PASSED THROUGH A CATALYST BED, IN WHICH THE AMMONIA IS THE NOX REDUCING IT TO NZ. SCR DESIGN OPERATING TEMPERATURE IS 780F, AND DESIGN REMOVAL EFICIENCY IS 90%. A SOURCE TEST IS REQUIRED WITHIN 90 DAYS AFTER STARTUP FOR NOX, CO, HOG, NH3, PM, SOX, THE FACILLITY IS IN RECLAIM, AND WILL HAVE CEMS FOR NOX AND OZ, THE PERMIN			CAMAGO COM			NOT NAME TAKE
27-1-10	רואלאוט אווע אווע	ngAlen-Oinen rnovess	5,7	MMDICHT	TECOMINES COMO FOR MINE I		4000	-FMVD &	H		AVALUABLE

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:

Permit Date Between 1/1/1937 And 11/12/2007

And Process Type Contains "12.3": Industrial-Size Bollers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gascous Fuel & Gascous Fuel Mixtures

And Process Contains 'Heater'
Pollutant: Carbon Monoxide

			모	IRU THRUPUT			EMIS	EMISUMIT	EMIS EMISLIMIT EMISLIMITIAVG MISS STDUNIT AVGTIME	STDE STDUNI	STDLIMIT AVGTIME
RBLCID	RBLCID FACILITYNAME	PROCESSNAME	PUT	LIND	PROCESSNOTES	CTRLDESC II	LIMIT	IMIT 1 IUNIT	TIMECONDITION LIMIT LIMIT	LIMIT   LIMIT	CONDITION
		A & B VACUUM TOWER HEATERS (3-08		MMBTU/H		PROPER DESIGN, OPERATION, AND GOOD					30-DAY ROLLING
-LA-0211	"LA-0211 GARYVILLE REFINERY	& 4-08)	155.2 EA	Α.		ENGINEERING PRACTICES				0.04 LB/MM E	0.04 LB/MM BTU AVERAGE
		NAPHTHA HYDROTREATER STRIPPER				PROPER DESIGN.					30-DAY
		REBOILER HEATER (6-08) & KHT			6-08: 138.4 MMBTU/H 10-08: OPERATION, AND GOOD	OPERATION, AND GOOD			neene.		ROLLING
-LA-0211	'LA-0211 GARYVILLE REFINERY	STRIPPER REBOILER HEATER (10-08)			121.8 MMBTU/H	ENGINEERING PRACTICES				0.04 LB/MMB	0.04 LB/MMBTU AVERAGE
						PROPER DESIGN,					30-DAY
		SATS GAS PLANT HOT OIL HEATER (14-				OPERATION, AND GOOD					HOLLING
*LA-0211	*LA-0211 GAHYVILLE REFINERY	(08)	183.3 M	83.3 MMBTU/H		ENGINEERING PRACTICES				0.04 LB/MMB	0.04 LB/MMBTU AVERAGE

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria: Permit Date Between 1/1/1997 And 11/12/2007 ial-Size Boilers/Furnaces (more than 100 million Btu/H): (

And Process Type Contains "12.3"; Industrial-Size Bollers/Furnaces (more than 100 million BtwH, up to/Including 250 million Btw/H); Gaseous Fuel & Gaseous Fuel Mixtures Pollutant: Nitrogen Oxides (NO<sub>x</sub>) And Process Contains 'Keater'

CONDITION AVGTIME STDLIMIT 0.0125 LB/MMBTU 0.0125|LB/MMBTU 0.0125 LB/MMBTU LB/MMBTU O.025 LB/MMBTU 0.032 LB/MMBTU 0.06 LB/MMBTU 0.07 LB/MMBTU 0.0125 LB/MMBTU 3.045 LB/MMBTU D.059 LB/MMBTU 0.06 LB/MMBTU STDUNIT EMISLIMIT1AVG STDEMIS TIMECONDITION SLIMIT 0.0125 LB/MMBTU 3-HR AVERAGE 0.0125|LB/MMBTU |3-HR AVERAGE 0.0125 LB/MMBTU 3-HP AVERAGE THREE 1-HOUR TEST AVERAGE 0.032 LB/MMBTU 3-HR AVERAGE 0.0125 LB/MMBTU ROLLING AVG 0,025 LB/MMBTU ROLLING AVG THREE HOUR 3-HOUR AVERAGE 0.04 LB/MMBTU O.0125 LB/MMBTU 0.06 LB/MMBTU 0.07 LB/MMBTU EMISLIMIT 0.045 LB/MMBTU 0.059 LB/MMBTU 0.06 LB/MMBTU TINO. EMIS ULTRA LOW-NOX BURNERS ULTRA LOW NOX BURNERS JLTRA LOW NOX BURNERS JLTRA LOW NOX BURNERS JLTRA LOW NOX BURNERS D REDUCTION LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION LOW NOX BURNERS AND SELECTIVE CATALYTIC LOW NOX BURNERS AND SELECTIVE CATALYTIC OW-NOX BURNERS IDENTIFIED BY ID # B-08509 LOW NOX BURNERS 6-81; 135 MM BTU/HR 2005-*IONE INDICATED* REDUCTION H2S CONCENTRATION < DENTIFIED BY EQUIPMENT ESIGN CAPACITY IS 165.0 THIS EQUIPMENT
| IDENTIFIED BY ID # B-15116
| THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-14: 195 MM BTU/HR 2005-17: 159 MM BTU/HR 2005-18: 231 MM BTU/HR 2005-29: 195 MM BTU/HR 2005-32: 159 MM BTU/HR 2005-37: 173 MM BTU/HR 1 PAIS UNIT IS IDENTIFIED BY EQUIPMENT ID # 8-FUELS ARE NATURAL GAS AND REFINERY FUEL GAS. REFINERY GAS, NATURAL THIS EQUIPMENT IS IDENTIFIED BY ID # 8-051 CAPACITY IS 1 MMBTU/H. THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-NOT SPECIFIED WHICH PETROLEUM GAS. IT IS SOURCES ALSO FIRE AUTHORIZED RATED COMBINATION OF TYPE OF FUEL IS PROCESSNOTES SOURCE BURNS GAS, AND LIQUID 10500 THIS EQUIPMENT THIS EQUIPMENT NATURAL GAS MMBTU/H BUT 192 MMBTU/H IID # B-05120 PRIMARY. 122 MMBTU/H 129 MMBTU/H 222 MMBTU/H MMBTU/H 211 MMBTU/H 117 MMBTU/H 135 MMSTU/H 165 MMBTU/H 165 MMBTU/H THRUPUT 145 MMBTU/H E 5 THE 둳 CATALYTIC REFORMING UNIT CHARGE FRACTIONATOR HEATER DISTILLATE HYDHOTREATER SPLITTER REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005-VACUUM CRUDE CHARGE HEATER CATALYTIC REFORMING UNIT INTERHEATER NO. 2 CATALYTIC REFORMING UNIT CRUDE UNIT HEATER, H-102A CRUDE UNIT HEATER, H-102B HYDROCHACKER UNIT MAIN BUTANE CONVERSION UNIT ISOSTRIPPER REBOILER BOILERS AND HEATERS CRUDE HEATER, H101B INTERHEATER NO. PROCESSNAME SUPERHEATER REBOILER HEATER VALERO REFINING CO. - TEXAS "LA-0213 ST. CHARLES REFINERY TPI PETROLEUM INC., VALERO ARDWORE REFINERY
TPI PETROLEUM INC., VALERO ARIZONA CLEAN FUELS YUMA ARIZONA CLEAN FUELS YUMA ARIZONA CLEAN FUELS YUMA ARIZONA CLEAN FUELS YUMA ARIZONA CLEAN FUELS YUMA ARIZONA CLEAN FUELS YUMA ARIZONA CLEAN FUELS YUMA TX-0429 CITY LA-0114 ST. JAMES STYRENE PLANT ARDMORE REFINERY KENAI REFINERY **FACILITYNAME** AZ-0046 4Z-0046 AZ-0046 OK-0089 0.4-0089 PBLCIO 4Z-0046 AZ-0046 4Z-0046 AZ-0048 AK-0037

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/19/2007
And Process Type Contains "12.3": Industrial-Size Bollers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NO<sub>2</sub>)

			-		>	<i>x</i>					
RBLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS EMISLIMIT	MIT EMISLIMITIAVG STDEM	Ø	STOUNIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI RĖFINERY	ORUDE HEATER, H101A	140	MMBTUAH	INSTALLED PRICH TO 1975, THEREFORE NOT RECUIRED TO COMPLY WITH THE PSD PROGRAM DESIGN CAPACITY OF 140.0 MMBTUM FUELS ARE NATURAL FUELS ARE NATURAL GAS, REFINERY GAS AND LPG, NO INDICATION IS PROVIDED AS TO WHICH STHE PRIMARY FUEL.	NONE INDICATED	0.25 LBAMMRTI				
OK-0098	PONCA CITY REF	CRUDE VACUUM UNIT, HEATER H-0016			Compliance to be verified by stack testing	ULTHA LOW NOX BURNERS	3.73 LB/H	365 day rolling average	0.035	B/MMBTU	
TX-0375		LYONDELL - CITGO REFINING, LP ISOM II WEST REACTOR FEED HEATER		104.25 MMBTU/H	EMISSION POINT NO. BTU- HF106.	SCR	3.8 LB/H	SEE NOTES	0.036	LB/MMBTU	0.036 LB/MMBTU CALCULATED
PA-0231	UNITED REFINERY CO.	DELAYED COKER UNIT, HEATER	118	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart QQQ, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR AG Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	LOW NOX BURNERS	4.04 LB/H		0,035	Catc Using 0.095 LB/MMBTU Input	Calculated using heat
TX-0375		LYONDELL - CITGO REFINING, LP BTU-NO. 1 REACTOR FEED HEATER	121.74	ммати/н	EMISSION POINT NO, BTU- HF103.	SCH	4.4 LB/H	SEE NOTES	0.036	BAMMBTU	0.036 LB/MMBTU CALCULATED
LA-0197	ALLIANCE REFINERY	LOW SULFUR GASOLINE FEED HEATER NO. 1	138.12	138.12 MMBTU/H	AVERAGE HEAT INPUT = 115.10 MMBTU/H	ULTRA LOW NOX BURNERS WITH INTERNAL FLUE GAS RECIRCULATION	4.6 LB/H	HOURLY	0.04	B/MMBTU	ANNUAL AVEHAGE
		HDS-1 HEATER	140	MMBTU/H	MMBTU/H EMISSION POINT 96H-201	ULTRA LOW NOX BURNERS	5.6 LB/H		0.04	0.04 LB/MMBTU	CALCULATED
PA-0231	UNITED REFINERY CO.	NORTH CRUDE HEATER	147	ММВТИЛ	The north crude heater was modified by installing fow NOx burners. The reduction of NOX emissions reduces the overall increase below significant levels allowing the project to net out" of NSH and PSD for NOX."	LOW NOX BURNERS	6.68 LB/H		0.045	0.045 LB/MMBTU	Calculated using heat input
LA-0119	LAKE CHARLES REFINERY	HEATER, CRUDE VACUUM UNIT FEED (H-20002)	150	ммвти/н	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	ULTRA LOW NOX BURNERS	6.8 LB/H*	HOURLY MAXIMUM	0.038	0.038 LB/MMBTU1	
TX-0395	DIAMOND SHAMBOCK MCKEE PLANT	NO 1 INTERHEATER	147.2	MMBTU/H			7.36 LB/H		0.051	B/MMBTU	0.05 LB/MMBTU CALCULATED
X-0375	TX.0375 LYONDELL . CITGO REFINING, LP ORTHOXYLENE II HEATER	ORTHOXYLENE II HEATER	226.42 M	M9TU/H		SCH	8.2 LB/H	SEE NOTES	0,0361	.B/MM8TU	0.036 LB/MMBTU CALCULATED
K-0098	OK-0098 PONCA CITY REF	CRUDE CHARGE UNIT, HEATER H-0001			Compliance to be verified by stack testing, then monitored with CEM	ULTRA LOW NOX BURNERS	8.75 LB/H	365 day average	0.05	0.05 LB/MMBTU	
4-0119	LA-0119 LAKE CHARLES REFINERY	HEATER, NO. 4 CTU (H4050)	237	237 MMBTU/H	UNIT BURNS NATURAL GAS, AND REFINERY OFF GAS, FORMERLY IDENTIFIED AS H-40001	ULTRA LOW NOX BURNERS	9.1 LB/H*	HOURLY MAXIMUM	0.032	0.032 LB/MMBTU	

December 2007

CEC, Inc. 061-933.0002

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1957 And 11/192007
And Process Type Contains "12.3": Industrial-Size Bollers/Furnaces (more than 100 million Btu/H, up to/Including 250 million Btu/H); Geseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Poliutant: Nirrogen Oxides (NO<sub>2</sub>)

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			Ē	222				MISCIMIT	EMISCIMIT EMISCIMITAVG STOEMIS STOOMS	S DEMIS		AVGTIME
RBLCID	RBLCID FACILITYNAME	PROCESSNAME		LIND	PROCESSNOTES	CTRLDESC	LIMIT1 11	TINDI	TIMECONDITION SLIMIT		LIMIT	CONDITION
		•			ORGANIC NITROGEN AND							
					SULFUR FROM THE FEED							
					STREAMS, FEEDSTOCK IS							
-					MIXED WITH HYDROGEN,							
					HEATED, AND FED TO A							
					REACTOR, A CATALYTIC							
					REACTION CONVERTS THE							
~~~					ORGANIC SULFUR TO							
					HYDROGEN SULFIDE AND							
rus van					THE NITHOGEN							
					COMPOUNDS TO							
					AMMONIA. THE EFFLUENT							
					STREAM IS COOLED AND							
					EXCESS HYDROGEN							
					REMOVED FOR RECYCLE.							
					HYDROGEN SULFIDE IS							
					REMOVED FROM THE							
					HYDROGEN STREAM BY							
					AN AMINE ABSORBER AND							
					ROUTED TO THE SRU.				••			
					NEW EQUIPMENT UNDER							
					THE AMENDMENT							
					INCLUDES A SECOND							
					REACTOR, ADDITIONAL							
					PREHEAT TRAIN, AN							
					ADDITIONAL REACTOR							
					PRODUCT FLASH DRUM, A							
					HYDROGEN PURIFICATION	-						
					MEMBRANE AND AN							
					ADDITIONAL HYDROGEN							
	CITGO CORPUS CHRISTI	MIXED DISTILLATE HYDROHEATER			MAKEUP COMPRESSOR.							
TX-0478		REBOILER HEATER	82	MMBTU/H	AS PART OF THE	LOW NOX BURNERS	9.9 LB/H	H/H				
		-										
TX-0395	PLANT	NO. 1 REFORMER CHARGE HEATER	248	MMBTU/H			12.4 LB/H	B/H		0.05	LB/MMBTU C	0.05 LB/MMBTU CALCULATED
					EMISSION PT NO: BOILER-							
TX-0375	TX-0375 LYONDELL - CITGO HEFINING, LP (BOILER NO. 12	BOILER NO. 12	245	MMBTU/H	MMBTU/H 12, SHALL BE SHUTDOWN.		19.6 LB/H	B/H		0.08	LB/MMBTU (C	0.08 LB/MMBTU CALCULATED

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1987 And 11/12/2007
And Process Type Contains "12.3"; Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NO.)

			THRU	THRUPUT		ū	SIME	FMISIMIT	EMISI IMIT1AVG	STDEMIS	TIMITA	STOLIMIT
	PUT		TIND		PROCESSNOTES	CTRLDESC			TIMECONDITION SLIMIT	SLIMIT		CONDITION
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N. T. W.	)	3£≥	Z ∓ S	<u>ś</u> ±≥	HYDROGEN REFORMER, MODELLIH 1207 R001							
		ď	<u> </u>	T.	FUNC EQUIP: PROVIDES							
	I 1	I i	I i	Ξì	HEAT TO CATYST FILLED							
				_	UBES TO PHODUCE							
		J. 2	<u> </u>	<u> </u>	MYDROGEN-", FUEL_TYPE: NATURAL GAS (WARM UP							
					AND SUPPLEMENT),							
				<u>*</u> ,	SCHEDULE: CONTINUOUS,				-			
					HD: 24, DM: 7, WM: 52,							
				<u> </u>	NOTES, AMINOINIA 13 MINES							
			2	<u> </u>	MIXTURE IS PASSED							
		<u></u>	Ė	ř	THROUGH A CATALYST			***				
<b>E</b>	ш.	8	8	ᆱ	BED, IN WHICH THE							
AM	AM	AM	AM	¥	AMMONIA REACTS WITH							
ON	2	S	S	2	NOX REDUCING IT TO N2.							
OS.	OS	S	၁၉	တ္တ	SCR DESIGN OPERATING							
		Ë.	Ë	H	EMPERATURE IS 760F,							
	- T	<u>ब</u>	<u>ব</u>	₹	AND DESIGN REMOVAL							
	<u>.</u>	<b></b>	<u></u>	Ü	EFFICIENCY IS 90%. A							
<u> </u>	<u> </u>	<u>~</u>	<u>~</u>	ത്	SOURCE TEST IS							
r.	œ	<u>oc</u>	OC.	Œ	REQUIRED WITHIN 90							
<u> </u>	<u> </u>	<u> </u>	<u> </u>	a	DAYS AFTER STARTUP							
<u> </u>		<u></u>	<u>R</u>	Ľ.	FOR NOX, CO, ROG, NH3,			•				
<u> </u>	<u>a</u>	<u>a.</u>	ā	ā,	PM, SOX. THE FACILITY IS							
<u> </u>		<u>Z</u> 1	<u></u>	<b>≝</b> ⊐	IN RECLAIM, AND WILL HAVE CEMS FOR NOY AND			walana				
8	8	<u> 8</u>	<u> </u>	ő	O2, THE PERMIT			PPMVD @				
CA-1113 PRAXAIR HEATER-OTHER PROCESS 117.6 MMBTU/H   RI	117.6			Œ	MMBTU/H REQUIRES CEMS FOR NH3	SCR SYSTEM	503	50 3% 02	뀨	0.061	0.061 LB/MMBTU	
						ULTRA LOW NOX BURNERS	-					
ON OUR CONTRACT CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A CONTRACT OF A		2000	1000			(ULNB) AND SELECTIVE						
155.0	ACCOUNT LOWER TEXT EAST (5:00					COLDEN TO DEDOCUTION				0.0450	ANNUAL ANGEROR	ANNOAL
NAPHTHA HYDROTREATER STRIPPER						III TRA I OW NOX BUBNERS	t			20.0	רכוואומום	300000
		30-9	00	မို	6-08: 138.4 MMBTU/H 10-08:	(ULNB) WITHOUT AIR						ANNIA
10-08)		-			121.8 MMBTU/H	PREHEAT				0.03	0.03 LB/MMBTU AVERAGE	AVERAGE
						ULTRA LOW NOX BURNERS	-					
SATS GAS PLANT HOT OIL HEATER (14-	S GAS PLANT HOT OIL HEATER (14-	102 0 MAKOTI WU	MANOTINE			(ULNB) WITHOUT AIR				ć	,	ANNUAL
100.00	10:00	TO COMMISSION	0 0			ישיוייריי	_			3	こうつき かんしょう しょう はんしょう	リカイロロンベー

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1987 And 11/192007
And Process Type Contains "12.3"; Industrial-Size Bollers/Furnaces (more than 100 million Btw/H, up to/including 250 million Btw/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutent: Suffur Dioxide (SO.2)

RBLCID	RBLCID FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PROCESSNOTES	CTALDESC	EMIS EMISLIMIT	IMIT EMISLIMITIAVG STDEM	STDEMIS		STDLIMIT AVGTIME CONDITION
TX-0375	LYONDELL - CITGO REFINING, LP	TX-0375 LYONDELL - CITGO REFINING, LP ISOM II WEST REACTOR FEED HEATER   104.25	104.25	ммвти/н	EMISSION POINT NO. BTU- HF106.	LÓW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H FOLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 MORE AND TOTAL S CONTENT NO MORE THAN 5.0 GR/100 DSCF.	2.7 LB/H		0.0261	.B/MMBTU	0.028 LEMMBTU CALCULATED
PA-0231	UNITED REFINERY CO.	DELAYED ÇOKER UNIT, HEATER	118		The unit is subject to the NSPS 40 CFR Subpart J. Subpart GGG, Subpart GGG. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 MMBTUM Subpart FF.	LOW SULFUR REFINERY GAS	2,71 LB/H		0,023	LB/MMBTU	Calculated using heat input
TX-0375		LYONDELL - CITGO REFINING, LP BTU-NO. 1 REACTOR FEED HEATER	121.74	мивтин	EMISSION POINT NO. BTU- HF103.	LOW S FUEL: FUEL GAS WITH HAS CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H FOLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 BOSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/100 DSCF.	3.1 LB/H		0.025	B/MMBTU	0.025 LB/MMBTU CALCULATED
LA-0197		LOW SULFUR GASOLINE FEED HEATER NO. 1	138.12	MMBTU/H	AVERAGE HEAT INPUT =	COMBUSTION OF LOW SULFUR (NSPS J COMPLIANT) FUELS	3.1 LB/H	HOURLY	0.02691	ANNUAL 0.0269 LB/MMBTU AVEHAGE	ANNUAL
DIAMO TX-0395 PLANT	DIAMOND SHAMROCK MCKEE PLANT	NO 1 INTERHEATER	147.2	MMBTU/H			5.54 LB/H				

December 2007

## Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/f/1997 And 11/12/2007

Ohio River Clean Fuels, LLC

And Process Type Contains "12.3": Industrial-Size Bollers/Furnaces (more than 160 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures And Process Contains 'Heater'

Pollutant: Sulfur Dioxide (SO<sub>2</sub>)

0.026 LB/MMBTU CALCULATED 0.026 LB/MMBTU CALCULATED CONDITION STDLIMIT AVGTIME STDUNIT EMISLIMIT1AVG STDEMIS TIMECONDITION SLIMIT EMISCIMIT FINDE 5.7 LB/H 5.8 LB/H 6.3 LB/H EMIS FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN CONTENT NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S. BASIS, OR NATURAL GAS MORE THAN 0.1 GR/DSCF LOW S FUEL: FUEL GAS WITH H2S CONTENT NO WITH H2S CONTENT NO MORE THAN 0.25 GR/100 OVER A 3 H ROLLING SCF AND TOTAL S 5.0 GR/ 100 DSCF. CTRLDESC REACTOR, A CATALYTIC REACTION CONVERTS THE 245/MMBTU/H 12. SHALL BE SHUTDOWN. COMPOUNDS TO AMMONIA, THE EFFLUENT STREAM IS COOLED AND AN AMINE ABSORBER AND HYDROGEN PURIFICATION STREAMS, FEEDSTOCK IS PRODUCT FLASH DRUM, A 1YDROGEN SULFIDE AND REMOVED FOR RECYCLE. HYDROGEN SULFIDE IS ORGANIC NITROGEN AND NEW EQUIPMENT UNDER SULFUR FROM THE FEED MIXED WITH HYDROGEN REATED, AND FED TO A HYDROGEN STREAM BY ADDITIONAL HYDROGEN MAKEUP COMPRESSOR. REACTOR, ADDITIONAL ADDITIONAL REACTOR ORGANIC SULFUR TO REMOVED FROM THE ROUTED TO THE SRU. INCLUDES A SECOND EMISSION POINT NO.: **EXCESS HYDROGEN** PHEHEAT TRAIN, AN MEMBRANE AND AN THE AMENDMENT PROCESSNOTES 82 MANBTU/H AS PART OF THE THE NITROGEN 226.42 MMBTU/H ORTHOII-H2. THRUPUT 판 MIXED DISTILLATE HYDROHEATER REBOILER HEATER LYONDELL - CITGO REFINING, LP ORTHOXYLENE II HEATER PROCESSNAME TX-0375 LYONDELL - CITGO REFINING, LP BOILER NO. 12 REFINERY - WEST PLANT CITGO CORPUS CHRISTI **FACILITYNAME** RBLCID TX-0478 TX-0375

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1987 And 11/192007
And Process Type Contains "12.3": Industrial-Size Bollers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gassous Fuel & Gassous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Suffur Dioxide (\$0.2)

				***************************************	77							
RBLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PHOCESSNOTES	CTRLDESC	EMIS EN	EMISLIMIT 1UNIT	EMISLIMIT1AVG STDEM	δ	STDUNIT	STDLIMIT AVGTIME CONDITION
	,				THE PERMIT INDICATES HEATERS MAY BURN NATURAL GAS, REFINERY GAS, OR A COMBINATION							
LA-0149	LOUISIANA REFINING DIVISION	DEASPHALTING HEATER	221	MMBTU/H	MMBTU/H OF THE TWO.	LOW SULFUR FUEL	8.85 LB/H	Ŧ		90	LB/MMBTU	0.04 LB/MMBTU CALCULATED
TX-0385	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER CHARGE HEATER	248	MMBTU/H			9.33 LB/H	£				
LA-0149	LOUISIANA REFINING DIVISION	COKER HEATER	241.1	MMBTU/H		USE OF LOW SULFUR FUEL	9.64 LB/H	Ŧ		0.04	0.04 LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	VACUUM CRUDE CHARGE HEATER	101	THIS L BY EO MMBTU/H 02100	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # 8- 02100		35 PPMV		DAILY AVERAGE			NOT AVAICABLE
AZ-0046		HYDROCHACKER UNIT MAIN FRACTIONATOR HEATER	211	M/DTU/H		S LIMITED TO 35 PPM.	35 PPMV		DAILY AVERAGE			NOT AVAILABLE
AZ-0046		CATALYTIC REFORMING UNIT CHARGE HEATER	122	ММВТИЛН	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 05110	SULFUR LIMITED TO 35 PPM IN FUEL.	35 PPMV		DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 1	192	M/UTBMM	THIS EQUIPMENT IDENTIFIED BY EQUIPMENT MMBTU/H ID # 8-05120	S LIMITED TO 35 PPM.	35 PPMV		DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 2	129	MMBTU/H	THIS EQUIPMENT IS MMBTUM IDENTIFIED BY ID # B-05130 S LIMITED TO 35 PPM.	S LIMITED TO 35 PPM.	35 PPMV		DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER SPLITTER REBOILER	117	MMBTU/H	THIS EQUIPMENT MMBTUIH IDENTIFIED BY ID # B-08509 S LIMITED TO 35 PPM.	S LIMITED TO 35 PPM.	35 PP	AMdd	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	BUTANE CONVERSION UNIT ISOSTRIPPER REBOILER	222	MMBTU/H	THIS EQUIPMENT SULFUR LIMITED TO 36 MABTUIH IDENTIFIED BY 10 # B-15110 PPM IN FUEL BURNED.	SULFUR LIMITED TO 35 PPM IN FUEL BURNED.	35 P.P	\Mdd	DAILY AVERAGE			NOT AVAILABLE
PA-0231	UNITED REFINERY CO.	NORTH CRUDE HEATER	147	MWBTU/H	The north crude heater was modified by installing low NOx burners. The reduction of NOx emissions reduces the overal increase below significant levels allowing the project to not out of NSR and PSD for NOx.*	USE OF DESULFURIZED	46.22 1.B/H	Į			Cator Using 0.3 HEAMMBTU Input	Calculated using heat
OK-0095		HOT OIL HEATERS				LOW SULFUR FUEL	160 \$0	160 S02 PPMDVfuel limit	uel limit			see note
TX-0442	SHELL OIL DEER PARK	TWENTY ONE FURNACES					300 PPM	M				
TX-0442	SHELL OIL DEER PARK	DHT H2 HEATER					300 PPMV	MV				
"LA-0211	"LA-0211 GARYVILLE REFINERY	A & B VACUUM TOWER HEATERS (3-08 & 4-08)	155.2	MMBTU/H EA.		USE OF LOW SULFUR REFINERY FUEL GAS				25	25 PPMV AS H AVERAGE	ANNUAL AVERAGE
*LA-0211	1-4-0211 GARYVILLE REFINERY	NAPHTHA HYDROTREATER STRIPPER REBOILER HEATER (6-08) & KHT STRIPPER REBOILER HEATER (10-08)			6-08: 138.4 MMBTU/H 10-08: 121.8 MMBTU/H					25	ANNUAL 25 PPMV AS HAVERAGE	ANNUAL AVEHAGE
*LA-0211	"LA-0211 GARYVILLE REFINERY	SATS GAS PLANT HOT OIL HEATER (14- 08)	183.3	ммвти/н		USE OF LOW SULFUR REFINERY FUEL GAS				25	25 PPMV AS HAVERAGE	ANNUAL AVERAGE

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/192007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO<sub>2</sub>)

HBLCtD.	HBLCID. FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS EMISIC	AESLIMIT EMIS	EMISLIMIT EMISLIMIT1AVG STDEMIS STDUNIT	MIS STDUNIT	STDLIMIT AVGTIME CONDITION
-LA-0213	1.4-0213 ST. CHARLES REFINERY	REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005- 32, & 2005-37			\$*************************************	USE OF PIPELINE QUALITY NATURAL GAS OR REFINERY FUEL GASES WITH AN H2S CONCENTRATION LESS THAN 100 PPMV (ANNUAL AVERAGE),		SEE	SEE NOTE		
					INSTALLED PHIOR TO 1975, THEREFORE NOT THEREORE NOT WITH THE PSD PROGRAM, DESIGN CAPACITY OF 140.0 AMMBTUM AUTHORIZED RATED AUTHORIZED RATED GAS, REFINERY GAS AND IPOG. NO INDICATION IPOG. NO INDICATION FOR AN ON INDICATION FOR AN ON INDICATION FOR AN ON INDICATION FOR AN ON INDICATION FOR AN ON INDICATION IS FOR AN ON INDICATION IS FOR AN ON INDICATION IS FOR AN ON INDICATION IS FOR AN ON INDICATION IS FOR AN ON INDICATION IS FOR AN ON INDICATION IS FOR AN ON INDICATION IS FOR AN ON INDICATION IS FOR AND AND AND AND AND AND AND AND AND AND	MONE INDICATED AS SOURCE WAS INSTALLED					
AK-0037	KENAI REFINERY	CRUDE HEATER, H101A	140	140 MMBTU/H		SUBJECT TO BACT-PSD.					
					65.0 H. "AAL	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS,		S S			
AK-0037	AK-0037 KENAI REFINERY	CRUDE HEATER, H1018	165	МВТОЛ		168 PPMV H2S. GAS, 168 PPMV H2S.		POLLU	POLLUTANT NOTES		

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/192007
And Process Type Contains "12.3": Industrial-Size Boliera/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

			Ι		Ι α, .	т—
STDLIMIT AVGTIME CONDITION				0.013 LB/MMBTU CALCULATED	CALCULATED FROM FINAL HOUBLY EMISS LIMIT	
STDUNIT	0.005 LB/MMBTU	UTBIMINEL 1800.0		LB/MMBTU	UTSMM/BTU	
STDEMIS	0.005	0.005		0.013	0.00	
EMISLIMIT1AVG STDEN			HOURLY MAXIMUM	SEE MOTES	SEE ROTES	
EMISLIMIT 1UNIT	0.005 LEMMMBTU	C.0005 LBYAMABTU	1,1 LB/H	1.33 LB/H	1.56 L8/H	
EMIS LIMIT1	500'0	0.005	-	1.33	1.56	
CTRLDESC	NONE INDICATED		GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	LOW S FUEL: FUEL GAS WITH HAS CONTENT NO MORE THAN 0.1 GRUDSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 BSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	LOW S FUEL: FUEL GAS WITH HES CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH HES CONTENT NO MORE THAN 0.25 GR/100 BSCF AND TOTAL S GONTENT NO MORE THAN 5.0 GR/100 DSCF.	GOOD COMBUSTION
PROCESSNOTES	INSTALLED PRIOR TO 1975, THEREFORE NOT REGUIRED TO COMMELY WITH THE PSD PROGRAM, DESIGN CAPACITY OF 140,0 MMBTUM AUTHORIZED RATED AUTHORIZED RATED GAS, REFINERY GAS AND LPG, NO INDICATION IS LPG, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	DESIGN CAPACITY IS 165.0 MMBTUH BUT AUTHORIZED RATED "SCAPACITY IS 1 MMBTUH. "SOURCE BURNS COMBINATION OF REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS, IT IS NOT SPECIFIED WHICH TYPE OF FUEL IS PRIMARY.	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	EMISSION POINT NO. BTU- HF108.	EMISSION POINT NO. BTU- HF103.	UNIT BURNS NATURAL GAS AND REFINERY OFF
THRUPUT JNIT	MMBTU/H	M MBTUTA	MMBTU/H	EMISS 104.25 MMBTU/H HF106.	121.74 MMBTU/H	
THRU PUT	140	165	150			
PROCESSNAME	CRUDE HEATER, H101A	CRUDE HEATER H1018	HEATER, CRUDE VACUUM UNIT FEED (H-20002)	LYONDELL - CITGO REFINING, LP ISOM II WEST REACTOR FEED HEATER	LYONDELL - CITGO REFINING, LP BTU-NO. 1 REACTOR FEED HEATER	
FACILITYNAME	KENAI REFINERY	KENAL RESINERY	LAKE CHARLES REFINERY	YONDELL - CITGO REFINING, LP	YONDELL - CITGO REFINING, LP	
RBLCID F		AK-0037 H				

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Bollers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutent: Particutate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PROCESSNOTES		EMIS E	EMISLIMIT E	EMISLIMIT1AVG STIMECONDITION S	STDEMIS	STDUNIT /	STDLIMIT AVGTIME CONDITION
TX-0375	LYONDELL - CITGO REFINING, LP BOILER NO. 12	BOILER NO. 12	245		EMISSION PT NO: BOILER- MMBTUM 12. SHALL BE SHUTDOWN.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GRUDSCF OVER A 3 H FOLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL \$ CONTENT NO MORE THAN 5.0 GR/100 DSCF.	1.83 LB/H	¥		0.007	B/MMBTU	0.007 LB/MMBTU CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP ORTHOXYLENE II HEATER	ORTHOXYLENE II HEATER	226.42		EMISSION POINT NO.: MMBTUM ORTHOI-H2.	LOW SULFUR CONTENT FUEL. USE REFINERY FUEL 6.1 GAPUSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.	2.89 LB/H		SEE NOTES	0.013	B/MMBTU	0.013 LB/MMBTU CALCULATED
LA-0114	ST. JAMES STYRENE PLANT	SUPERHEATER	165	MMBTU/H		GOOD DESIGN AND OPERATION	0.005	0.005 LB/MMBTU		0.005	0.005 LB/MMBTU	
LA-0213	LA-0213 ST. CHARLES REFINERY	REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005- 32, & 2005-37			6-81: 135 MM BTU/HR 2005- 14: 195 MM BTU/HR 2005- 16: 231 MM BTU/HR 2005- 29: 195 MM BTU/HR 2005- 32: 159 MM BTU/HR 2005- 37: 173 MM BTU/HR 37: 173 MM BTU/HR NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.0074	A C.0074 LBAAMBTU A	ANNUAL AVERAGE			
AZ-0046	ARIZONA CLEAN FUELS YUMA	VACUUM CRUDE CHARGE HEATER	101	ммвтил			0.0075	0.0075]LB/MMBTU	THREE-HOUR AVERAGE	0.0075	0.0075 LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYBROCRACKER UNIT MAIN FRACTIONATOR HEATER	211	MMBTU/H			0.0075	LE/MMBTU	THREE-HOUR AVG	0.0075	0.0075 LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 1	192	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY EQUIPMENT ID # 8-05120		0.0075 LI	0.0075 LB/MMBTU 3	3-HR AVERAGE	0.00751	0.0075 LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 2	129		THIS EQUIPMENT IS MMBTU/H IDENTIFIED BY ID # B-05130		0.0075 L(	0.0075 LB/MMBTU 3	, 3-HR AVERAGE	0.00751	0.0075 LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER SPLITTER REBOILER	117	MMBTU/H			0.0075 U	0.0075 LB/MMBTU 3	3-HR AVERAGE	0,0075	0.0075 LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT CHARGE HEATER	122	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 05110		0.0075 U	0.0075 LB/MMBTU 3-HR AVG.	3-HR AVG.			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	BUTANE CONVERSION UNIT ISOSTRIPPER REBOILER	222	ММВТU/Н	MMBTU/H   IDENTIFIED BY ID # B-15110		0.0075 [1]	3/MMBTU	0.0075 LBMMBTU 3-HR AVERAGE			NOT AVAILABLE

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2007
And Process Typa Contains "12.3"; Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gassous Fuel & Gassous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

				A	<u> </u>			***************************************				
RBLCID	FACILITYNAME	PROCESSNAME	PUT THE	THRUPUT	PROCESSNOTES	CTALDESC	EMIS EMISL	IMIT	EMISLIMIT1AVG STDEM	ß	STDUNIT	STDL!MIT AVGTIME CONDITION
PA-0231	PA:0231 UNITED REFINERY CO.	DELAYED COKER UNIT, HEATER		MMBTU7H	ai a	SPRAY CHAMBER, GOOD COMBUSTION PRACTICE				0.0009	UE	Catculated using heat Input
TX-0478	CITGO CORPUS CHRISTI	MIXED DISTILLATE HYDROHEATEH REBOILER HEATER	82.7	MMBTU/A	ONGANIC NITROGEN AND SULFUR FROM THE FEED STREED ST		H/87 19'0	T				
OK-0098	OK-0098 PONCA CITY REF	CRUDE VACUUM UNIT, HEATER H-0016		_ "/		GOOD COMBUSTION PRACTICES	H/81 8'0		365 day average	0.0075	0.0075 LB/MMBTU	
LA-0121	CONVENT REFINERY	HDS-1 HEATER	140 8	MMBTU/H	MMBTU/H EMISSION POINT 96H-201	GOOD COMBUSTION PRACTICES	1.04 LB/H			0.02	0.02 LB/MMBTU	
LA-0128	CONVENT REFINERY	CRU CHARGE HEATER	144	WMBTU/H		GOOD COMBUSTION PRACTICES	1.29 LB/H			0.02	0.02 LB/MMBTU	
OK-0098	OK-0038 PONCA CITY REF	CRUDE CHARGE UNIT, HEATER H-0001			Compliance to be verified by stack testing, then monitored to with CEM	GOOD COMBUSTION PRACTICES	1,31 LB/H		365 day average	0.0075	0.0075 LB/MMBTU	
LA-0128	CONVENT REFINERY	CRU INTER HEATER NO.1	140	WIMBTU/H	MMBTU/H EMISSION POINT 4F-502	GOOD COMBUSTION PRACTICES	H/87 96'1			0.02	0.02 LB/MMBTU	
LA-0193	LA-0193 STYRENE MONOMER PLANT	8Z RECOVERY COLUMN HEATER HS- 2103	182.1	MMBTU/H		USE OF CLEAN BURNING FUELS (NATURAL GAS)	1.4 LB/H		HOURLY MAXIMUM	0.01	0.01 LB/MMBTU AVERAGE	ANNUAL AVERAGE

6C-17

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/192007
And Process Type Contains "12.3": Industrial-Size Bollers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Particulate Matter

Providence and Parket	***************************************			***************************************								
			THA	HRU THRUPUT			EMIS	EMISLIMIT	EMISLIMIT EMISLIMIT1AVG STDEMIS STDUNIT AVGTIME	TDEMIS	STDUNIT A	STDLIMIT AVGTIME
RBLCID	RBLCID FACILITYNAME	PROCESSNAME	PCT	UNIT	PROCESSNOTES	CTALDESC	LIMIT	- Ling	TIMECONDITION SLIMIT	LIMIT L	LIMIT	CONDITION
					ESS	USE OF CLEAN BURNING						
					GAS 110,4 MMBTU/HR	FUELS (NATURAL GAS AND			HOUPILY			ANNUAL.
LA-0193	STYPENE MONOMER PLANT	REHEATER HS-8220	195	MMBTU/H	195 MMBTU/H NATURAL GAS	PHOCESS GAS)	r.	.5 LB/H	MAXIMUM	0.01	0.01 LB/MMBTU AVERAGE	VERAGE
						GOOD COMBUSTION						
LA-0128	LA-0128 CONVENT REFINERY	VPS1 ATM, HEATER NO.2	동	MMBTU/H	201 MMBTU/H EMISSION POINT 1F-202	PRACTICES	1.58	1.56 LB/H		0.02	0.02 LB/MMBTU	
	DIAMOND SHAMROCK MCKEE		L									
TX-0395  PLANT	PLANT	NO 1 INTERHEATER	147.2	147.2 MMBTU/H			1,57	1.57 LB/H				
	DIAMOND SHAMROCK MCKEE							***************************************				
TX-0395 PLANT	PLANT	NO. 1 REFORMER CHARGE HEATER	248	248 MMBTU/H			2.64	2.64 LB/H				
						PROPER DESIGN,						
		A & B VACUUM TOWER HEATERS (3-08		MMBTU/H		OPERATION, AND GOOD					<u></u>	3-HOUR
*LA-0211	"LA-0211 GARYVILLE REFINERY	& 4-08)	155.2 EA.	EA.		ENGINEERING PRACTICES				0.0075 L	0.0075 LB/MMBTU AVERAGE	WERAGE
		NAPHTHA HYDROTREATER STRIPPER				PROPER DESIGN,						
		REBOILER HEATER (6-08) & KHT			6-08: 138.4 MMBTU/H 10-08: OPERATION, AND GOOD	OPERATION, AND GOOD					<u></u>	3-HOUR
1.LA-0211	*LA-0211 GARYVILLE REFINERY	STRIPPER REBOILER HEATER (10-08)			121,8 MMBTU/H	ENGINEERING PRACTICES				0.0075	0.0075 LB/MMSTU AVERAGE	VERAGE
						PROPER DESIGN,						
	-	SATS GAS PLANT HOT OIL HEATER (14-				OPERATION, AND GOOD					<del>(1)</del>	3-HOUR
*LA-0211	*LA-0211 GAHYVILLE REFINERY	(08)	183.3	83.3 MMBTU/H		ENGINEERING PRACTICES				0,0075	0,0075 LB/MMBTU AVERAGE	VERAGE

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Bollers/Furnaces (more than 100 million Btu/ft, up to/including 250 million Btu/ft); Gaseous Fuel & Gaseous Fuel Mixtures.
And Process Contains "Heater"
Poliutent: Volatile Organic Compounds (VOC)

RBLCID	FACILITYNAME	PHOCESSNAME	THRU	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS E	EMISLIMIT 1UNIT	EMISLIMIT1AVG STDEN TIMECONDITION SLIMIT	STOEMIS STOUNIT SLIMIT LIMIT		STDLJMIT AVGTIME CONDITION
LA-0114	ST. JAMES STYRENE PLANT	SUPERHEATER	165	165 MMBTU/H		PROPER OPERATING TECHNIQUES WITH AUTOMATIC CONTROLS, 3% EXCESS O2	0.004	0.004 LB/MMBTU		0.004 LB/MMBTU	UMBTU	
OK-0102	PONCA CITY REFINERY	PHOCESS HEATERS AND BOILERS			4	GOOD COMBUSTION PRACTICE	0.0054 L	0.0054 LB/MMBTU			<u>.</u>	
.LA-0213	ST. CHARLES REFINERY	REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005- 32, & 2005-37			,	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS, FUELS	0.0054		ANNUAL AVERAGE			
1×.0478	CITGO CORPUS CHRISTI	MIXED DISTILLATE HYDROHEATER REBOILER HEATER	S S S S S S S S S S S S S S S S S S S	MWBTUN	ORGANIC NITROGEN AND SULFUR FROM THE FRED STUFED STREADSTOCK IS MIXED WITH HYDROGEN HEATED, AND FED TO A REACTOR, A CATALYTIC REACTOR, A CATALYTIC REACTOR, A CANCHTS THE ORGANIC SULFUR TO HYDROGEN SULFIDE AND THE NITROGEN SOULED AND EXCESS HYDROGEN STREAM BY ANDROGEN PUBLICATION MEMBRANE AND AN ADDITIONAL HYDROGEN MAKEUP COMPRESSOR.		0.44 LBH	, <del>K</del>				
CE	CEC, Inc. 061-933.0002				6C-19					Decen	December 2007	007

December 2007

Module 6 - Fischer-Tropsch and Product Upgrade

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1987 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boliers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
And Process Contains "Heater"
Pollutant: Volatile Organic Compounds (VOC)

RBLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT UNIT	PROCESSNOTES	E CTRLDESC	EMIS EMISL	SLIMIT B	EMISLIMIT EMISLIMITAVG STDEMIS STDUNIT 1UNIT TIMECONDITION SLIMIT LIMIT	TDEMIS STDUI		STDLIMIT AVGTIME CONDITION
					The unit is subject to the NSPS 40 CFH Subpart J. Subpart GGG, Subpart QGG. The unit is also subject to			,				
PA-0231	UNITED REFINERY CO.	DELAYED COKER UNIT, HEATER	116	MMBTU/H	ο.	GOOD COMBUSTION PRACTICE	.0.545 LB/H	<del></del>			•	:
TX-0375		LYONDELL - CITGO REFINING, LP ISOM II WEST REACTOR FEED HEATER		104.25 MMBTU/H HF106.	ION POINT NO. BTU-	NONE INDICATED	0.56 LB/H	т.				
TX-0395		NO 1 INTERHEATER		147.2 MMBTU/H			0.58 LB/H	т				
LA-0197	ALLIANCE REFINERY	LOW SULFUR GASOLINE FEED HEATER NO. 1		ммвтим	AVERAGE HEAT INPUT = 138.12 MMBTU/H	GOOD COMBUSTION PRACTICES AND GOOD ENGINEERING DESIGN	0.62 LB/H		HOUBLY MAXIMUM	***************************************	***************************************	
TX-0375	LYONDELL - CITGO REFINING, LP	TX-0375 LYONDELL - CITGO REFINING, LP BTU-NO. 1 REACTOR FEED HEATER	121.74	121.74 MMBTU/H HF103.	NO. BTU-	NONE INDICATED	0.66 LB/H	T				
TX-0395	DIAMOND SHAMBOCK MCKEE PLANT	NO. 1 REFORMER CHARGE HEATER	248	248 MMBTU/H			0.98 LB/H	т				
TX-0375	TX-0375 LYONDELL - CITGO REFINING, LP ORTHOXYLENE II HEATER	ORTHOXYLENE II HEATER	226.42	MMBTU/H	226.42 MMBTU/H ORTHOII-H2.	NONE INDICATED	1.22 LB/H	т				
TX-0375	TX-0375 LYONDELL - CITGO REFINING, LP BOILER NO. 12	BOILER NO. 12	245	MMBTU/H	O: BOILER- HUTDOWN.	NONE INDICATED	1.32 LB/H	т				
.LA-0211	"LA-0211 GARYVILLE REFINERY	A & B VACUUM TOWER HEATERS (3-08 & 4-08)	MM 155.2 E.A.	MMBTU/H EA.	<b></b>	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				3-HOUR 0.0015 LB/MMBTU AVERAGE	3-IMBTU AI	3-HOUR AVERAGE
-LA-0211	-LA-0211 GARYVILLE REFINERY	NAPHTHA HYDROTREATER STRIPPER REBOILER HEATER (8-08) & KHT STRIPPER REBOILER HEATER (10-08)			6-08: 138.4 MMBTU/H 10-08: 121.8 MMSTU/H	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				3-HOUR 0.0015 LB/MMBTU AVERAGE	3-IMBTU AV	3-HOUR AVERAGE
.LA-0211	'LA-0211 GARYVILLE REFINERY	SATS GAS PLANT HOT OIL HEATER (14- 08)		183.3 MMBTU/H		PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				3-HOUR 0.0015 LB/MMBTU AVERAGE	-8 AMBTU A\	3-HOUR AVERAGE

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria.
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boliers/Furnaces (100 million Btw/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Carbon Monoxide

Module 6 - Fischer-Tropsch and Product Upgrade

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria: Permit Date Between 1/1/1997 And 11/12/2007

And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gassous Fuel & Gassous Fuel Mixtures And Process Contains 'Heater'

Pollutant: Carbon Monoxide

0.082 LB/MMBTU CALCULATED 0.083 LB/MMBTU CALCULATED 0.08 LB/MMBTU CALCULATED 0.08|LB/MMBTU |CALCULATED 0.083 LB/MMBTU CALCULATED 0.08 LB/MMBTU CALCULATED 0.083 LB/MMBTU CALCULATED 0.08|LB/MMBTU|CALCULATED 0.082 LB/MMBTU CALCULATED STDLIMIT AVGTIME CONDITION 0.035 LB/MMSTU 0.02 LB/MMBTU 0.035 LB/MMBTU STDUNIT STDEMIS EMISLIMITIAVG STDEMITIMECONDITION SLIMIT EMISLIMIT 0.035|LB/MMBTU 0.02 LB/MMBTU 0.035|LB/MMBTU TNO. 4 LB/H 4.5 LB/H 4.9 LB/H 6.2 LB/H 6.4 LB/H 6.9 LB/H 3.2 LB/H 5,7 LB/H 7.9|LB/H EMIS LIMIT1 NONE INDICATED NONE INDICATED NONE INDICATED NONE INDICATED NONE INDICATED NONE INDICATED NONE INDICATED NONE INDICATED NONE INDICATED **JONE INDICATED.** NONE INDICATED. NONE INDICATED CTRLDESC SOURCE BURNS NATURAL GAS, REFINERY GAS, AND MISSION POINT NO. BTU-EMISSION POINT NO, BTU-SOURCE BURNS NATURAL CAPACITY IS 2.0 MMBTU/H. DESIGN CAPACITY IS 22.2 MISSION POINT NO. BTU NDICATION IS PROVIDED DESIGN CAPACITY IS 31.8 LIQUID PETROLEUM GAS. NO INDICATION IS BUT AUTHORIZED RATED 31.8 MMBTU/H IS THE PRIMARY FUEL. PROVIDED AS TO WHICH CAPACITY IS 1 MMBTU/H. DAPACITY IS 1 MMBTU/H. CAPACITY IS 1 MMBTU/H NATURAL GAS AND LPG: AS TO WHICH IS THE PRIMARY FUEL, DESIGN OPERATING LIMIT PER YEAR IS 125 HOURS. EMISSION PT. NO. ARU PETROLEUM GAS, NO IS THE PRIMARY FUE! AUTHORIZED RATED EMISSION POINT NO. **4UTHORIZED RATED** EMISSION POINT NO NO INDICATION IS PROCESSNOTES SOURCE BURNS GAS AND LIQUID MMBTU/H BUT MMBTU/H BUT 75 MMBTU/H (ISOMII-F5. 54.77 | MMBTU/H | HF107 69.68 MMBTU/H HF104 38.34 MMBTU/H H501 THRUPUT 22.2 MMBTU/H 58.95 MMBTU/H 96,23 MMBTU/H 2 MMBTU/H 49 MMBTU/H B3.7 MMBTU/H 77.62 MMBTU/H THRU PUT TX:0375 |LYONDELL - CITGO REFINING, LP |ISOM II EAST REACTOR FEED HEATER NATURAL GAS SUPPLY HEATER, H704 TX-0375 LYONDELL - CITGO REFINING, LP BTU- NO.3 REACTOR FEED HEATER TX.0375 LYONDELL - CITGO REFINING, LP BTU-NO.4 REACTOR FEED HEATER
BTU-REFORMATE STABILIZER POWERFORMER PREHEATER, H201 TX-0375 | LYONDELL - CITGO REFINING, LP | BTU-NO.2 REACTOR FEED HEATER TX-0375 LYONDELL - CITGO REFINING, LP HEATER SOM II COMBINATION SPLITTER TX-0375 |LYONDELL - CITGO REFINING, LP BENZENE STABILIZER HEATER RESIDUAL OIL HEATER, H612 TX-0375 |LYONDELL - CITGO REFINING, LP ORTHOXYLENE I HEATER PROCESSNAME TX-0375 LYONDELL - CITGO REFINING, LP REBOILER TX-0375 LYONDELL - CITGO REFINING, LP HEATER AK-0037 KENAI REFINERY 4K-0037 KENAI REFINERY AK-0037 KENAI REFINERY RBLCID FACILITYNAME

RBLC Matching Facilities for Search Criteria:
Permit Data Between 1/1/1997 And 11/1/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furneces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutent: Carbon Monoxide

		B B B B B		*		Laboratory and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second seco				
RBLCID	FACILITYNAME	PHOCESSNAME	THRU	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS EMISLIMIT B	EMISLIMIT1AVG	STDEMIS STDUNIT SLIMIT	AIT AVGTIME CONDITION
AK-0037	KENAJ REFINERY	POWERFORMER PREHEATER, H202	រក	MMBTU/H	*SOURCE ALSO BURNS REFINERY GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 51.0 MMBTUH, BUT CAPACITY IS 1 MMBTUH.	NONE INDICATED.	0.035 LB/MMBTU		0.035 LB/MMBTU	UTB
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H203	27.9	ММВТU/Н	'SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIGUID FOTROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 27.9 MMBTUH, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUH.	NONE INDICATED.	0.035 LEMMBTU	ת	0.035]LB/MMBTU	вти
AK-0037	KENAJ REFINERY	POWERFORMER REHEATER, H204	53.8	MW8TU/H	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS GIVEN AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 53.8 MMBTUM. AUTHORIZED RATED CAPACITY IS 1 MMBTUM. FUEL IS NOT SPECIFIED. OPERATING LIMIT PER YEAR NOT TO EXCEED TY, OZ AS MEASURED IN EXHAUST GAS BY CEMS.	NONE INDICATED.	0.035 LB/MMBTU		. LB/MMBTU	BTU
AK-0037	KENALREFINERY	HYDROCRACKER RECYCLE GAS HEATER, 1461	38.91	MMBTUM	* EMISSION POINT BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY FUEL. DESIGN THROUGPUT IS 38.9 MANBTUH. AUTHORIZED RATED CAPACITY IS 1 MANBTUH. POERATING LIMIT NOFRATING LIMIT OF SKOED 6% OZ AS MEASURED IN EXHAUST MANBTUH. GAS BY REQUIRED CEMS.	NOME INDICATED.	0.035 LB/MMBTU	5	0.035 LB/MMBTU	UTB

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/12/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Poliutant: Carbon Monoxide

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RBLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS EMISLIMIT LIMIT1 1UNIT	TIMECONDITION SUMIT	STDEMIS N SUMIT	STDUNIT	STOLIMIT AVGTIME CONDITION
AK-0037	KENA! HEFINEHY	HYDROCRACKER RECYCLE GAS HEATER, 1402		MMBTU/H		NONE INDICATED.	0.035 L8/MMBTU	p	0.035	0.035 LBYMMBTU	
AK-0037	KENALBEFINERY	HYDROCRACKER FRACTIONATER REBOILER, H403	· On	MMBTU/H		NONE INDICATED.	UTBWMMBIL BYMMBIL	2	90.03	O.035 L.B/MMBTU	
AK-0037	KENA! REFINERY	HYDROCRACKER STABILIZER REBOILER, H404	64.4	MAMBTU/H		NONE INDICATED.	0.035 LB/MMBTU	D.	0.035	0.035 LB/MMBTU	
K-0037	AK-0037 KENAJ REFINERY	HOT OIL HEATER, H609	56	MAMBTU/H	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS S6 MMBTU/H BUT AUTHORIZED RATED 56 MAMBTU/H CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035 LB/MMBTU	ח	0.035	0.035 LB/MMBTU	

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/22007
And Process Type Contains "13.3"; Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Poliutant: Carbon Monoxide

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RBLCID	FACILITYNAME	PHOCESSNAME	THRU THRUPUT PUT ONIT	PROCESSNOTES	CTRLDESC	EMIS EMISLIMIT LIMIT1 1UNIT	IT EMISLIMIT1AVG STDEMIS TIMECONDITION SLIMIT	STDEMIS	STOUNIT /	STOLIMIT AVGTIME CONDITION
		FIRED STEAM GENERATOR, H701	H/DT8MM 85.86		NONE INDICATED.	0.035 LB/MMBTU	D.	0.035	0.035 LB/MMBTU	
AK-0037		FIRED STEAM GENERATOR, H702	HUTBMM 56.55		NONE INDICATED.	0.035 LB/MMBTU	ū	0.035	0.035 LB/MMBTU	
AK-0037		FIRED STEAM GENERATOR, H801	32 MMBTU/H	*SOURCE BURNS NATURAL GAS AND LIQUID PETFOLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 32 MMBTUH, BUT THIS AUTHORIZED MANBTUH.	NONE INDICATED.	0.035 LB/MMBTU	D.	0.035	0.035 LE/MMBTU	
AK-0037	KENA! REFINERY	HOT GLYCOL HEATER, H802	10.8 MMBTU/H	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.8 MMBTUH CAPACITY IS 11.8 MMBTUH CAPACITY IS 11.8 MMBTUH.	NONE INDICATED.	0.035 LB/MMBTU	n.	0.035	0.035 LB/MMBTU	
AK-0037		HEACTION FURNACE BURNER, H1101	S.2 MMBTU/H	"SOURCE BURNS NATURAL (GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 5.2 MMBTUM. BUT AUTHORIZED RATED	NONE INDICATED.	0,035 LB/MMBTU	D.	0.035	0.035 LBMMBTU	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel Mixtures
And Process Contains "Hester"
Poliutant: Cerbon Monoxide

GISTORIA	FACILITYNAME	PROCESSNAME	THBU PUT	THRUPUT	PHOCESSNOTES	CTRLDESC	EMIS EMISLIMIT LIMIT1 1UNIT	MIT EMISLIMITIAVG	VG STDEMIS ION SLIMIT	STDUNIT	STDLIMIT AVGTIME CONDITION
1	<i>\</i>	#1 REHEATER STARTUP BURNER, H1102	1.65	ММВТО/Н	*SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.85 MMBTU/H.	NONE INDICATED.	0.035 LB/MMBTU	UT8	0.03	0.035 LB/MMBTU	
AK-0037	XENA! REFINERY	#2 REHEATER STARTUP BURNER, H103	1.15	MMBTU/H	SCURCE BURNS NATURAL GAS, REFINERY GAS, AND LICKID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. IDESIGN CAPACITY IS 1.15 MMBTUAL.	NONE INDICATED.	0.035 LB/MMBTU	BŢŪ	0.038	0.035 LEYMMBTU	
	KENAI REFINERY	#3 HEHEATER STARTUP BURNER, H1104	1.05		*SOURCE BURNS REFINERY GAS, NATURAL, GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL, DESIGN CAPACITY IS 1,05 MMBTU/H.	NONE INDICATED.	0.035 LEMMBTU	UTB	0.035	E LB/MM8TU	·
	KENA! REFINERY	TAIL GAS BURNER, H1105	N	MMBTU/H	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPAGITY OF SOURCE IS 2.00 MMBTU/H.	NONE INDICATED.	0.035 LB/MMBTU	BITU	200	0.035 LB/MMBTU	
7	KENAI REFINERY	#4 REHEATER STAPTUP BURNER, H106	6.1	MMSTU/H		NONE INDICATED.	o.oas[LBAAMBTU	UTBI	800	0.035 LB/MMBTU	
AK-0037	AK-0037 KENAI REFINERY	VACUUM TOWER HEATER, H1701	91			NONE INDICATED.	0.035 LEAMINETU	BTU	0.03	C. O. O. S. L. B. AMBTU	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria: Permit Date Botween 1/1/1997 And 11/12/2007

And Process Type Contains "13.3"; Commercial/Institutional-Size Bolters/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures And Process Contains 'Heater'

Pollutant: Carbon Monoxide

NOT AVAILABLE CONDITION AVAILABLE 0.04 LB/MMBTU AVERAGE AVGTIME No 0.04 LB/MMBTU EMISLIMITIAVG STDEMIS STDUNIT EMISLIMIT 1UNIT 0.04 LB/MMBTU 5.5 LB/H 5.5 L8/H EMIS UMIT1 PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PHACTICES NONE INDICATED. NONE INDICATED. NONE INDICATED CTRLDESC 5-08: 75.7 MMBTU/H 9-08: 73.6 MMBTU/H 11-08: 85.05 MMBTU/H 12-08: 85.05 MMBTU/H OPERATING LIMIT FOR THE OPERATING LIMIT FOR THE SOLAR CENTAUR TURBINE AUTHORIZED CAPACITY IS SOLAR CENTAUR TURBINE DIESEL. NO INDICATION IS 438 H PER YEAR, SCC AND SOURCE BURNS NATURAL THE DESIGN CAPACITY IS GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; THE DESIGN CAPACITY IS COMBINATION (CT/E-1400) BURNING DIESEL FUEL IS IS THE PRIMARY FUEL. DESIGN CAPACITY IS 11.2 NDICATION IS PROVIDED GAS, LIQUID PETROLEUM GAS, AND DIESEL NO CAPACITY IS 1 MMBTU/H. \*SOURCE BURNS NATUR/ PROVIDED AS TO WHICH BURNING NATURAL GAS. 36.5 MMBTU/HR AND THE SOURCE BURNS LIQUID PROVIDED AS TO WHICH BURNING NATURAL GAS. & DUCT BURNER WHEN 36.5 MMBTU/H BURNING DIESEL FUEL PROCESS CODES ARE PROCESS CODES ARE COMBENATION OF THE AS TO WHICH FUEL IS IS THE PRIMARY FUEL AUTHORIZED RATED NATURAL GAS, AND PHIMARY, SCC AND APPLICABLE WHEN AND DUCT BURNER APPLICABLE WHEN NO INDICATION IS IS 438 H/YR WHEN PETHOLEUM GAS, MMBTU/H. THE PHOCESSNOTES MMBTU/H, BUT 36.5 MMBTU/H. 36.5 MMBTU/H 11.2 MMBTU/H THRUPUT Ę THRU CHARGE HEATER (5-08), KHT REACTOR NAPHTHA HYDROTREATER REACTOR CHARGE HEATER (9-08), & HOU TRAIN 182 REACTOR CHARGE HEATERS (11-PRIP RECYCLER H2 FURNACE, H1202 DUCT BURNER FOR STEAM DUCT BURNER FOR STEAM GENERATION, E-1410 GENERATION, E-1400 PROCESSNAME 08 & 12-08) \*LA-0211 GARYVILLE REFINERY KENAI REFINERY AK-0037 KENAI REFINERY KENAI HEFINEHY FACILITYNAME AK-0037 AK-0037 RBLCID

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CALCULATED BY CATC

BAMMBTU

HOUPLY MAXIMUM

EB/H

TECHNIQUES.

CALCULATED BY CATC

0.043 LB/MMBTU

HOURLY MAXIMUM

0.46 LB/H

ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN,

USE GASEOUS FUELS, PROPER OPERATING

HEATER BURNS NATURAL GAS AND REFINERY OFF GAS

36.6 MMBTU/H

HEATER, HYDRODESULFURIZATION 4 (H-1201)

LA-0119 LAKE CHARLES REFINERY

CALCULATED BY CATC

0.2|LB/MM9TU

AAXIMUM **JOURLY** 

1.2 LB/H

ULTRA LOW NOX BURNERS

*TECHNIQUES* 

HEATER, HYDRODESULFURIZATION 4 (H-1202)

LAKE CHARLES REFINERY

LA-0119

LAKE CHARLES REFINERY

LA-0119

\*LA-0213 ST. CHARLES REFINERY

(ULNB), GOOD DESIGN

USE GASEOUS FUEL, PROPER OPERATING

HEATER BURNS NATURAL

GAS AND REFINERY OFF GAS

23 MWBTU/H

HEATER, HYDRODESULFURIZATION 7 (H-3201)

A-0119 LAKE CHARLES REFINERY

**TECHNIQUES** 

CALCULATED BY CATC

0.02 LB/MMBTU

HOURLY MAXIMUM

0.73 LB/H

ULTRA LOW NOX BURNERS

TECHNIQUES

(ULNB), GOOD DESIGN USE GASEOUS FUELS, PROPER OPERATING

HEATER BURNS NATURAL

GAS AND REFINERY OFF THIS UNIT IS IDENTIFIED

GAS.

HUTBWM 001

PETROLEUM REFINING, HEATER, VACUUM UNIT 3 (H-1103)

HYDROCRACKER UNIT CHARGE HEATER

70 MMBTU/H 10200

CALCULATED BY CATC

0.02 LB/MMBTU

HOUPLY

HOURLY MAXIMUM

## Module 6 - Fischer-Tropsch and Product Upgrade

STDLIMIT AVGTIME CONDITION

STDUNIT

STDEMIS

EMISLIMIT1AVG TIMECONDITION

Ohio River Clean Fuels, LLC

**FACILITYNAME** 

RBLCID

RBLC Matching Facilities for Search Criteria: Permit Date Between 1/1/1997 And 11/12/2007

And Process Type Contains "13.3"; Commerciat/Institutional-Size Bollers/Furnaces (100 million BtwH or less); Gaseous Fuel & Gaseous Fuel Mixtures And Process Contains 'Heater'

THREE ONE HOUR TEST 0.08 LB/MM BTU/AVERAGE EMISLIMIT 1UNIT 0.08 LB/MMBTU 0.46 LB/H\* 2.4 LB/H EMIS ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN, PROPER EQUIPMENT DESIGN AND OPERATION, DESIGN AND OPERATION, PRACTICES, AND USE OF GASEOUS FUELS PRACTICES, AND USE OF DESIGN AND OPERATION, PRACTICES, AND USE OF ULNB, GOOD DESIGN, USING GASEOUS FUEL, PROPER OPERATING USE GASEOUS FUEL, PROPER OPERATING GASEOUS FUELS PROPER EQUIPMENT PROPER EQUIPMENT SOOD COMBUSTION GOOD COMBUSTION GOOD COMBUSTION GASEOUS FUELS **TECHNIQUES** CTRLDESC 2: 24 MM BTU/HR 2004-3: 52 MM BTU/HR 2004-4: 86 MM BTU/HR 2005-5: 95 MM 2004-1: 86 MM BTU/HR 2004 HEATER BURNS NATURAL GAS AND REFINERY OFF GAS HEATER BURNS NATURAL GAS AND REFINERY OFF 60 MMBTUM GAS Pollutant: Carbon Monoxide 39-01; 75 MM BTU/HR H-39-H-30-03: 68 MM BTU/HR H-BTU/HR SOURCES ALSO BTU/HR 2005-35: 38 MM BTU/HR 2005-36; 15 MM BTU/HR 2005-12: 95 MM BTU/HR 2005-24: 42 MM BTU/HR 2005-27: 95 MM BTU/HR 2005-23: 95 MM BTU/HR 2005-6: 95 MM BTU/HR 2005-7: 95 MM BTU/HR 2005-8: 95 MM BTU/HR 2005-9: 42 MM SOURCES ALSO FIRE SOURCE ALSO FIRES FIRE NATURAL GAS. 02: 90 MM BTU/HR PROCESSNOTES VATURAL GAS. 48 MMBTU/H NATURAL GAS THRUPUT 23 MMBTU/H THRU PJ HEATERS 2004-1 - 2004-4, 2005-4, 2005-HEATER, HYDRODESULFURIZATION 7 8, 2005-9, 2005-23, 2005-24, 2005-35, & 2005-36; REBOILERS 2005-5, 2005-6, CPF HEATER H-30-03, H-39-01, & H-39-2005-7, 2005-12, 2005-27 02 (94-28, 94-29, & 94-30) PROCESSNAME F-33-05 (94-21)

ST. CHARLES REFINERY

"LA-0213

ST. CHAPLES REFINERY

LA-0213

THREE 1-HOUR TEST AVERAGE

6C-28

December 2007

0.04 LB/MMBTU

0.04 LB/MMBTU ROLLING AVG

AZ-0046 ARIZONA CLEAN FUELS YUMA

LAKE CHAPLES REFINERY

LA-0119

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btuff or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/22007
And Process Type Conteins "19.3"; Commercie/Unstitutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Nitrogen Oxides (NOx)

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RBLCID	FACILITYNAME	PHOCESSNAME	THAU	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS	EMISLIMIT 1UNIT	EMISCIMITIANG MISS TIMECONDITION LIMIT		늘	S I DLIMI I AVGTIME CONDITION
AZ-0046	ARIZONA GLEAN FUELS YUMA	CATALYTIC REFORMING UNIT DEBUTANIZER REBOILER	23.2	23.2 MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-05609 LOW NOX BURNERS	OW NOX BURNERS	0.03	B/MMBTU	0.03 LB/MMBTU 3-HR AVERAGE	0.03 LB/I	0.03 LB/MMBTU AVAILABLE	NOT AVAILABLE
AZ-0046		DELAYED COKING UNIT CHARGE HEATER NOS. 1 AND 2	99.5	ммвти/н	THESE TWO PEICES OF EQUIPMENT ARE IDENTIFIED BY ID #S B- 19.5 MIMBTUIH 14110B	LOW NOX BURNERS	0,03	B/MMBTU	0.03 LB/MMBTU 3-HR AVERAGE	0.03 LB/MMBTU	AMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	SPRAY DRYER HEATER	4	MMBTU/H	ED BY	LOW NOX BURNERS	0.03	B/MMBTU	0.03 LB/MMBTU 3-HR AVERAGE	0.03 LB/MMBTU	имвто	
	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER CHARGE HEATER	53:	25 MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08200 LOW NOX BURNERS	OW NOX BURNERS	0.033	B/MM8TU	0.033 LB/MMBTU 3-HR AVERAGE	0.033 LB/MMBTU	AMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT CHARGE HEATER	70	70 MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 10200	LOW NOX BURNERS	0.034	LB/MMBTU	THREE-HOUR 0.034 LB/MMBTU (POLLING AVG	0.034 LB/MMBTU	/WBTU	
-t.A-0213	1. A-0213 ST. CHARLES REFINERY	СРF ИБАТЕЯ Н-30-03, Н-39-01, & Н-39- 02 (34-28, 94-29, & 94-30)			H-3G-03: 68 MM BTU/HR H- 39-01; 75 MM BTU/HR H-39- 02: 90 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	LOW NOX BURNEAS	0.05	LB/MM BTU	THREE ONE HOUR TEST AVERAGE			
.LA-0213	'LA-0213 ST. CHARLES REFINERY	F-33-05 (94-21)	48	48 MMSTU/H	SOURCE ALSO FIRES NATURAL GAS.	LOW NOX BURNERS	3.36 LB/H	-B/H	HOURLY MAXIMUM	0.07 LB/MMBTU	MMBTU	
PA-0231	UNITED REFINERY CO.	FOC FEED HYDROTREATER HEATER	-6	МИВТИН	Q _ g	LOW NOX BURNEHS, GOOD COMBUSTION PRACTICE	1,82 LB/H	.B/H		0.02	Calci using 0.02 LB/MMBTU Input	Calculated using heat input
	ARIZONA CLEAN FUELS YUMA	NAPHTHA HYDROTREATER CHARGE HEATER	21.4	THIS L BY EQ 21.4 MMBTU/H 04200	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 04200	LOW-NOX BURNERS	0.03	LB/MMBTU	0.03 LB/MMBTU ROLLING AVG	0.03 LB/MMBTU	MMBTU	
AK-0037	AK-0037 KENAI REFINERY	POWERFORMER REHEATER, H206	48.8	MMBTUT	'SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 48.8 MMBTUH BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUH. NOT TO EXCRED 7% OZAS MEASURED IN EXHAUST MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.08	0.06 LEMMBTU		0.08 LB/MMBTU	WMBTU	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutent: Nitrogen Oxides (NOx)

			-	***************************************			-				-	
RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISUMIT EI	EMISLIMIT1AVG N TIMECONDITION	STDE MISS STDU LIMIT LIMIT	F	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	NATURAL GAS SUPPLY HEATER, H704	ر د	MMBTUR	<b>-</b>	NONE INDICATED	70	0.1 LB/MMBTU		0.11LB/I	0.1 LB/MMBTU	
AK-0037	KENAJ REFINERY	FIRED STEAM GENERATOR, H702	36.55	MMBTUH	유 사 H 3.55	NONE INDICATED	41.0	0.14 LBMMBTU		0.14 LB/MMBTU	MMBTU	
TX-0375	LYONDELL - CITGO REFINING, LP BENZENE STABILIZER HEATER	BENZENE STABILIZER HEATER	38.34	EMIS 38.34 MMBTU/H H501	SION PT. NO. ARU-	NONE INDICATED	3.8	3.8 LB/H		0.099 LB/I	MMBTUC	0.099 LB/MMBTU CALCULATED
AK-0037	KENAI REFINERY	HYDROCRACKER FRACTIONATER REBOILER, H403	50	ММВТИН	* SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 50 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 20 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 20 MMBTU/H, BUT AUTHORIZED 6% CA PAGUSTURED IN EXHAUST GAS BY INDICATED CEMS.	NONE JNDICATED,	0.00	0.06 LB/MMBTU		O.06 LEMMMBTU	MMBTU	
AK-0037	AK-0037 KENAI REFINERY	VACUUM TOWER HEATER, H1701	16	SOURCE GAS, REFI LPG; NO II PROVIDEI IS THE PR DESIGN C MARBTU/H MMBTU/H.	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 91	NONE INDICATED.	0.06	0.06 LEAMINBTU		0.06 LB/MMBTU	UTBMM	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/12/2007
And Process Type Contains "13.3": Commerciel/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Nitrogen Oxides (NOx)

a CiS	FACILITYNAME	PHOCESSNAME	THEU	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT EMISLIMIT1AVG MISS 1UNIT TIMECONDITION LIMIT	STDE MISS 8 LIMIT L	STDUNIT /	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H204	89 80 80 80 80 80 80 80 80 80 80 80 80 80	H/DTB/W/H	"SOURCE BURNS NATURAL GAS, REFINERY GAS, AND IGUDID PETROLEUM GAS. NO INDICATION IS GIVEN AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 53.8 MABTUH, AUTHORIZED MABTUH, EUEL IS NOT SPECIFIED. OPERATING LIMIT PER YEAR NOT TO EXCEED 7% OZ AS MEASURED IN EXHAUST GAS BY CEMS.	NONE INDICATED.	0.08	0.08 LEVAMMETU	·	1800	0.00 LB/MMBTU	·
AK-0037	KENA! REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H401	0.88 	Мизтин	A C C A C C A C C C C C C C C C C C C C	NONE INDICATED.	0.08	0.08 LB/MMBTU		0.08	0.08 LBAMMBTU	
AK-0037	AK-0037 KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, 1402	88	MMBTUH	* THIS SOURCE BURNS NATURAL GAS, LPG AND REFINERY GAS, NO INDEOPMATION IS PROVIDED AS TO WHICH FUEL TYPE IS PRIMARY. DESIGN CAPACITY IS 38 MMBTUIN BUT AUTHORIZED RATED CAPACITY IS 1 MMSTUIN. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% OZ AS MEASURED IN EXHAUST GAS BY BS MMBTUIN HEQUIRED CEMS.	NONE INDICATED.	90'0	0.06 LEMMABTU		0.08	0.08 LEMMBTU	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/22007
And Process Type Contains "13.3"; Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutent: Nitrogen Oxides (NOX)

RBLCID		-	ŀ		,							
			THRU	THRUPUT			EMIS	Ħ	EMISLIMIT1AVG		Ħ	AVGTIME
l	FACILITYNAME	PROCESSNAME	TJ.	TINU	PROCESSNOTES	CTRLDESC	_	TING	TIMECONDITION	LIMIT	Ī	CONDITION
	-				*SOURCE BURNS REFINERY GAS, NATURAL							
		-			GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE			,			-	
					PRIMARY FUEL, DESIGN CAPACITY IS 64.4							
					AUTHORIZED RATED							
					CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER	-						
					YEAR IS NOT TO EXCEED							
		HYDROCHACKER STABILIZER		i.			0	O OO HOWANGTII		800	O OR I RAMMATII	
32	AK-0037 KENAI REFINERY	HEBOILEH, H404	4.4	04.4 MINOS U/A		NOINE NADIONILED.	00:5			8		
				**********	NATURAL GAS AND LIQUID							
					INDICATION IS PROVIDED							
					AS TO WHICH IS THE							
					CAPACITY IS 32 MMBTU/H,							
					BUT THIS AUTHORIZED RATED CAPACITY IS 1							
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H801	33	MMBTU/H	32 ММВТU/Н ММВТU/Н.	NONE INDICATED.	0.1	0.1 LB/MMBTU		0.1 B	LB/MMBTU	
				AAAA	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID							
		<del></del> -			INDICATION IS PROVIDED AS TO WHICH IS THE							
					PRIMARY FUEL, DESIGN							
					CAPACITY IS 10.8 MMBTU/H BUT AUTHORIZED RATED							
AK-0037	KENAI REFINERY	HOT GLYCOL HEATER, H802	10.8	MMBTU/H	0.8 MMBTU/H CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.7	0.1 LB/MMBTU		0.1 LE	LB/MMBTU	
			·		SOURCE BURNS NATURAL GAS, REFINERY GAS, AND		•		<b>~</b> .			
					NO INDICATION IS							
		400			PROVIDED AS TO WHICH IS THE PRIMARY FUEL.							
					DESIGN CAPACITY IS 10,4 MMBTU/H, BUT							
23	VOCAN DEFINITION	PRIP ABSORBER FEED FURNACE, M1201/12013	10.4	MMBTU/H	AUTHORIZED RATED  0.4 MM8TU/H   CAPACITY IS 1 MMBTU/H.	NONE INDICATED.		0.1 LB/MMBTU		0.1 LE	0.1 LB/MMBTU	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Batween 1/1/1997 And 11/1/22007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel McCures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

			A STATE OF THE PERSON NAMED IN					_		0010	TIME INTO	Γ
	FACILITYNAME	PROCESSNAME	THRU PUT .	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT I	EMISLIMIT1AVG MISS TIMECONDITION LIMIT	MISS STDUNIT		
	KENA REFINERY	PRIP RECYCLER HZ FURNACE, H1202		ММВТU/Н		NONE INDICATED.	0.1	LEVANMETU		0.1 LB/MMBTU	UT8	
AK-0037	RONA DEFINE	RESIDUAL OIL HEATER, H612	22.2	22.22 MMBTU/H	SOURCE BURNS NATURAL GAS AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 22.2 MARGTUM BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUM. OPERATING LIMIT PER YEAR IS 125 HOURS.	NONE INDICATED.	41.0	0.14 LBMMBTU		0.14 LB/MMBTU	UTah	
		FIRED STEAM GENERATOR, H701	36.55	36.55 MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIGUID GAS, AND LIGUID NOT SPECIFIED WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 38.55 MMBTUH BUT CAPACITY IS 1 MMBTUH.	NONE INDICATED.	0.34	LBMMBTU		0.14 LB/MMBTU	UTBA	
I	AK-0037 KENAI REFINERY	REACTION FURNACE BURNER, H1101	r. C.	5.2 MMBTU/H	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 5.2 MMBTUM, BUT AUTHORIZED RATED	NONE INDICATED.	0.	0.14 LB/MMBTU		0.14 LB/MMBTU	MBTU	
AK-0037	KENAI REFINERY	#1 HEHEATER STARTUP BURNER, H1102	1.65	ММВТU/	SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL DESIGN CAPACITY IS 1.65 MMBTU/H MMBTU/H.	NONE INDICATED.	.0. 4.	0.14 LB/MMBTU		0.14 LB/MMBTU	ивти	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3": Commercial/institutional-Size Boilers/Furnaces (100 million Btw/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Poliutent: Nitrogen Oxides (NOx)

Module 6 - Fischer-Tropsch and Product Upgrade

GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.15 H1103
*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.05 H1104 1.05 AMMSTU/H MMBTU/H.
SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY OF TAIL GAS BURNER, H1105 2 MMBTUH SOURCE IS 2.00 MMBTUH.
URNER, 1.9,MMBTU/H
DESIGN CAPACITY IS 31.8 MMBTUPH BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUPH. 'SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS, AND INDICATION IS PROVIDED AS TO WHICH 31.8 MMBTUPH IS THE PRIMARY FUEL.

Ohio River Clean Fuels, LLC

And Process Type Contains "13.3"; Commerctai/nstitutional-Size Boilers/Furnaces (100 million Btu/H or leas); Gaseous Fuel & Gaseous Fuel Mixtures RBLC Matching Facilities for Search Criteria: Permit Date Between 1/1/1997 And 11/12/2007 And Process Contains 'Heater'

Pollutant: Nitrogen Oxides (NOx)

Module 6 - Fischer-Tropsch and Product Upgrade

NOT AVAILABLE AVGTIME CONDITION 0.25 LB/MMBTU 0.25 LB/MMBTU 0.25 LE/MMBTU STDUNIT EMISCIMITIAVG MISS TIMECONDITION LIMIT BURNING NATURAL GAS, 0.25 LB/MMBTU 0.25 LB/MMSTU 0.25 LB/MMBTU EMISLIMIT TUNIT 11.3 LB/H EMIS LİMIT1 NONE INDICATED. NONE INDICATED. YONE INDICATED NONE INDICATED. CTRLDESC PROCESSNOTES
\*SOURCE ALSO BURNS
REFINERY GAS AND
LIQUID PETROLEUM GAS,
NO INDIGATION IS PROVIDED AS TO WHICH FUEL IS PHIMARY, DESIGN CAPACITY IS 51.0 SOURCE BURNS NATURAL AUTHORIZED CAPACITY IS OPERATING LIMIT FOR THE SOLAR CENTAUR TURBINE COMBINATION (CT/E-1400) IS 438 H/YR WHEN THE DESIGN CAPACITY IS GAS, LIQUID PETROLEUM CAPACITY IS 1 MMBTUM. INDICATION IS PROVIDED INDICATION IS PROVIDED CAPACITY IS 56 MMBTU/H BUT AUTHORIZED RATED INDICATION IS PROVIDED REFINERY GAS, NATURAL NATURAL GAS, REFINERY CAPACITY IS 1 MMBTU/H. CAPACITY IS 1 MMBTU/H. BURNING NATURAL GAS. 36.5 MMBTUMR AND THE PRIMARY FUEL. DESIGN PROCESS CODES ARE BURNING DIESEL FUEL AS TO WHICH FUEL IS PRIMARY, SCC AND AS TO WHICH FUEL IS PETROLEUM GAS, NO GAS, AND DIESEL, NO AUTHORIZED RATED **AUTHORIZED RATED** AS TO WHICH IS THE AND DUCT BURNER APPLICABLE WHEN GAS, AND LPG, NO PRIMARY, DESIGN SOURCE BURNS CAPACITY IS 27.9 GAS, AND LIQUID 1 MMSTU/H. THE MMBTU/H, BUT MMBTU/H, BUT THRUPUT 56 MMBTU/H 36.5 MMBTU/H 27.9 MMBTU/H 51 MMBTU/H THRO РОЖЕВРОЯМЕН РВЕНЕАТЕР, H203 POWERFORMER PREHEATER, H202 DUCT BURNER FOR STEAM GENERATION, E-1400 HOT OIL HEATER, H609 **PROCESSNAME** KENAI REFINERY KENA! REFINERY KENAI REFINERY AK-0037 KENAI REFINERY FACILITYNAME AK-0037 AK-0037 AK-0037 RBLCID

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furneces (100 million Btu/H or less); Gaseous Fuel & Gassous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Nitrogen Oxides (NOx)

				ii S	Politikani: Mirogen Oxides (NOX)							
RBLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PHOCESSNOTES	CTRLDESC	EMIS I	EMISLIMIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	FN	STDLIMIT AVGTIME CONDITION
AK-0037	KENA! REFINERY	DUCT BURINER FOR STEAM GENERATION, E.1410	36.5	36.5 MWBTU/H	SOURCE BURNS LIQUID PETROLEUM GAS, AND NATURAL GAS, AND DIESEL, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. COMBINATION OF THE SOLAR CENTRANT THRINE & DUCT BURNER WHEN BURNING BIESEL FUEL IS A38 H PER YEAR, SCC AND PROCESS CODES ARE APPLICABLE WHEN BURNING DIESEL WHEN APPLICABLE WHEN BURNING NATURAL GAS. THE DESIGN CAPACITY IS 36.5 MMBTUM.	NONE INDICATED.	11.3 LB/H	В/Н	BURNING NATURAL GAS		TON	NOT AVAILABLE
TX-0375		LYONDELL - CITGO REFINING, LP STU-NO.4 REACTOR FEED HEATER	49	49 MMBTU/H		SCR	1.8 LB/H	B/H	SEE NOTES	0.04 LB/N	AMBTU C/	0.04 LB/MMBTU CALCULATED
TX-0375		BTU-REFORMATE STABILIZER REBOILER	54.77	54.77 MMBTU/H		SCR	8	2-LB/H	SEE NOTES	0.037 LB/N	AMBTU C/	LB/MMBTU CALCULATED
TX-0375		LYONDELL - CITGO REFINING, LP BTU- NO.3 REACTOR FEED HEATER	58.95	8.95 MMBTU/H	EMISSION POINT NO, BTU- HF105.	sca	2.1 LB/H	B/H	SEE NOTES	0.036 LB/N	AMBTU CA	0.036 LB/MMBTU CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	LYONDELL - CITGO REFINING, LP BTU-NO.2 REACTOR FEED HEATER	69.68	9.68 MMSTU/H		SCR	2.5 LB/H	B/H	SEE NOTES	0.036 LB/N	AMBTU CA	0.036 LB/MMBTU CALCULATED
TX-0375		LYONDELL - CITGO REFINING, LP ISOM II EAST REACTOR FEED HEATER	75	75 MMBTU/H	EMISSION POINT NO. ISOMII-F5.	SCA	2.7 LB/H	B/H	SEE NOTES	0,036 LB/N	AMBTU CA	0.036 LB/MMBTU CALCULATED
TX-0375	CYONDELL - CITGO REFINING, LP	ISOM II COMBINATION SPLITTER HEATER	77.62	7.62 MMBTU/H	-	SCR	2.8 LB/H	B/H	SEE NOTES	0.036 LB/N	AMBTU CA	0.036 LB/MMBTU CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II XYLENE REHUN TOWER HEATER	83.7	83.7 MMBTU/H		SCR	ë	3 LB/H	SEE NOTES	0.036 LB/N	AMBTU CA	0.036 LB/MMBTU CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP ORTHOXYLENE I HEATER	ORTHOXYLENE I HEATER	96.23	MMBTU/H	96.23 MMBTU/H ORTHOL:H1.	SCR	3.5 LB/H	B/H	SEE NOTES	0,036 LB/N	AMBTU CA	0.036 LEVMINBTU CALCULATED
'LA-0213	ST. CHARLES REFINERY	HEATERS 2004-1 - 2004-4, 2005-4, 2005-8, 2005-36, R 2005-36, R 2005-36, R 2005-36, R 2005-37, 2005-12, 2005-27	·		2004-1; 86 MM BTU/HR 2004-3; 52 MM BTU/HR 2004-3; 52 MM BTU/HR 2004-3; 86 MM BTU/HR 2005-6; 95 MM BTU/HR 2005-6; 95 MM BTU/HR 2005-8; 95 MM BTU/HR 2005-8; 95 MM BTU/HR 2005-8; 95 MM BTU/HR 2005-8; 95 MM BTU/HR 2005-2; 95 MM BTU/HR 2005-2; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM BTU/HR 2005-3; 95 MM	ULTRA LOW NOX BURNERS	0.0	UMBTU	0.00 LB/MMBTU TEST AVERAGE			
LA-0121	CONVENT REFINERY	H-OIL TRANSPORT HEATER	24	ММВТОЛН	21 MMBTU/H EMISSION POINT 70H-501	ULTRA LOW NOX BURNERS	0,84 LB/H	B/H		0.04 LB/N	MMBTU C	0.04 LB/MMBTU CALCULATED

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Boliers/Furnaces (100 million Btu/H or less); Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutent: Nitrogen Oxides (Nox)

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- C		5 4 4 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	THRU	THRU THRUPUT	ARTONORGO	0280	EMIS		EMISLIMIT EMISLIMITIAVG MISS STDL	STDE MISS STOUNIT	STOLIMIT AVGTIME
200	LACILI TINAME	FOUCESSIVAME	T	T				180	THE CONDITION		100
LA-0121	CONVENT REFINERY	H-OIL ATM, TOWER HEATER	29.4	MAMBTU/H	29.4 MAMBTU/H EMISSION POINT 70H-301.	ULTRA LOW NOX BURNERS	1.18	1.18 LB/H		0.04 LB/MMB	0.04 LB/MMBTU CALCULATED
LA-0119		HEATER, HYDRODESULFURIZATION 7 (H-3232)	23	HEA' GAS 23 MMBTU/H GAS	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS	1.4	1.4 LB/H	HOURLY MAXIMUM	0.06 LB/MMBTU	
LA-0119	+	HEATER, HYDRODESULFURIZATION 7 (H-3201)	23	HEA GAS 23 MMBTU/H GAS	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS	1,4	1.4 LB/H	HOURLY MAXIMUM	0.06 LB/MMBTU	- 2
UA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1201)	36.6	6.6 MMBTU/H		ULTHA LOW NOX BURNERS	2.2	2.2 LB/H	HOURLY MAXIMUM	0.06 LB/MMBTU	2
LA-0119		HEATER, HYDRODESULFURIZATION 4 (H-1202)	09	60 MMBTU/H		ULTRA LOW NOX BURNERS	3.6	3.6 LB/H	HOURLY MAXIMUM	0.06 LB/MMBTU	TU .
LA-0119		PETROLEUM REFINING, HEATER, VACUUM UNIT 3 (H-1103)	169	HEAT GAS 100 MMBTU/H GAS.	HEATEH BURNS NATURAL GAS AND REFINERY OFF GAS.	ULTHA LOW NOX BURNERS	6	9 ГВ/Н	HOURLY MAXIMUM	0.06 LB/MMBTU	J.
-CA-0211	-LA-0211 GARYVILLE REFINERY	NAPHTHA HYDRÖTREATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HOU TRAIN 1&2 REACTOR CHARGE HEATERS (11- 08 & 12-08)			5-08. 75.7 MMBTU/H 9-08. 73.8 MMBTU/H 11-08. 85.05 MMBTU/H 12-08. 85.05 MMBTU/H	ULTRA LOW NOX BURNERS (ULNB) WITHOUT AIR PREHEAT				0.03 LB/MMB	ANNUAL 0.03 LB/MMBTU AVERAGE
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 HYDROTREATER REBOILER : HEATER	32.7	22.7 MMBTU/H			1.48	1.48 LB/H		0.05 LB/MMB	0.05 LB/MMBTU CALCULATED
TX-0395		NO. 1 REBOILER STABILIZER REBOILER HEATER	4	S.7 MMBTU/H			2.06	2.06 LB/H		0.05 LB/MMBTU	2
TX-0395	1	NO. 1 REFORMER STABILIZER REPOILER HEATER	8	20 MMBTU/H			2.4	2.4 LB/H		0.12 L8/MMB	0.12 LB/MMBTU CALCULATED
.14.0211	<u> </u>	THERMAL DRYING UNIT HEATEC HEATER (194-1-81)	o,	MM BTU/H	UNIT DESTROYS VAPORS CREATED BY THE THENAL DRYING UNT WHICH HEATS SCLIDS SEGREGATED FROM WASTEWATER BY THE API 9.6 MM BTUM SEPARATORS.						

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/22007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnsces (100 million Btu/H or less); Gassous Fuel & Gassous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Particulate Matter

Cic	H O O I	PBCCESSNAME	THRU	THRU THRUPUT	PROCESSNOTES	CTRLDESC	EMIS LIMIT	EMISLIMIT 1UNIT	STDE EMISLIMIT1AVG MISS TIMECONDITION LIMIT	STDE MISS S LIMIT L	STDUNIT	STDLIMIT AVGTIME CONDITION
	TASE CHARLES BERINERY	FINING, HEATER, (H-1103)	9	HŲT	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	GOOD COMBUSTION PRACTICES AND USING CLEAN GASEOUS FUELS.	0.8	0,8 LB/H	HOURLY MAXIMUM			
A-0119	AKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 7 (H-3232)	R		HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	0.2	0.2 LB/H	HOURLY MAXIMUM	0.009	CALCULA 0.009 LB/MMBTU BY CATC	CALCULATED BY CATC
A-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1201)	36.6		HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	GÓCO COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	0.3	0.3 LB/H	HOURLY MAXIMUM			
A-0119	LAKE CHABLES BEFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1202)	9	60 MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	0.5	0.5 LB/H	HOURLY MAXIMUM	0.008 1	CALCULA 0.008 L8/MMBTU BY CATC	CALCULATED BY CATC
LA-0119	LAKE CHABLES BEFINERY	HEATER, HYDRODESULFURIZATION 7 (H-3201)	83		HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	1,1	LB/H*		0.048 L	.B/MMBTU	CALCULATED 0.048 LB/MMBTU  BY CATC
TX-0375	LYONDELL - CITGO HEFINING, LP BENZENE STABILIZER HEATER	BENZENE STABILIZER HEATER	38.34	мматил	EMISSION PT. NO. ARU- 34 MMBT UJH H501	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GRUDSCF OVER A 3 H HOLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 IOSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0.29	0.29 LB/H		0.007 L	B/MMBTU	0.007 LB/AM/BTU CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	LYONDELL - CITGO REFINING, LP BTU-NO.4 REACTOR FEED HEATER		49 MMBTU/H		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0,63	н/в1 89'0	SEE NOTES	0.013	UTBWMBTU	0.013 LB/MMBTU CALCULATED
9375	BTU-REFO TX-0375 LYONDELL - CITGO REFINING, LP REBOILER	BTU-REFORMATE STABILIZER REBOILER	54,77	EMISS 777 MMBTU/H HF107.	EMISSION POINT NO. BTU- HF107.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GRUSCE OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 BSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/100 DSCF.	0.7	0.7 LB/H	SEE NOTES	0.013	ымвти	0.013 LB/MMBTU  CALCULATED

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

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RBLCID	FACILITYNAME	PROCESSNAME	FUT L	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS I	EMISLIMIT 1UNIT	EMISCIMITIAVE MISS TIMECONDITION LIMIT	SIDE MISS STOUNT LIMIT LIMIT	STDUMIT AVGTIME CONDITION	
TX-0375		LYONDELL - CITGO REFINING, LP BTU- NO.3 REACTOR FEED HEATER	58.95 A		EMISSION POINT NO. BTU- HF105.	LOW S FUEL: FUEL GAS WITH HAS CONTENT NO MOHE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OH NATURAL GAS WITH H2S CONTENT NO MOHE THAN 0.25 GR/100 BSCF AND TOTAL \$ CONTENT NO MOHE THAN 5.0 GR/100 DSCF.	4.00	LB/H	SEE NOTES	0.013 LB/MMB	0.013 LB/MMBTU CALCULATED	D D
TX-0375		LYONDELL - CITGO REFINING, LP 8TU-NO.2 REACTOR FEED HEATER	09.68 N	I HULLAN	EMISSION POINT NO. BTU-	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 BOSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/100 DSCF.	0.89	LB/H	SEE NOTES	0.013 LB/MMB	0.043 LB/MMBTU CALCULATED	TED
TX-0375		LYONDELL - CITGO REFINING, LP ISOM II EAST REACTOR FEED HEATER		MMSTU/H	EMISSION POINT NO. 75 MMBT U/H ISOMII-F5.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	. 0.96	LB/H	SEE NOTES	0.013 LB/MMB	0.013 LB/MMBTU CALCULATED	TEO
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II COMBINATION SPLITTER HEATER	77.62	77.62 MMBTU7H	*	LOW S FUEL; FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF COVER A 3 H FOLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GF/ 100 DSCF.	0.99	LB/H	SEE NOTES	0.013 LB/MMB	0.013 LB/MMBTU CALCULATED	TED
TX-0375	ISOM II X TX-0375 LYONDELL - CITGO REFINING, LP HEATER	ISOM II XYLENE HERUN TOWER HEATER	83.7   A	83.7 MMBTU/H		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MOHE THAN 0.1 GR/DSCF OVER A 3 H FOLLING BASIS, OH NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 BSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GRV 100 DSCF.	1,06 LB/H	8/Н	SEE NOTES	0.013 LB/MMB	0.013 LEMMBTU CALCULATED	TEO

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commerciet/Institutional-Size Boilers/Furnaces (100 million BtwH or less); Geseous Fuel & Gaseous Fuel Mixtures
And Process Contains Heater
Pollutant: Particulate Matter

			***	,
STDLIMIT AVGTIME CONDITION	0.013 LE/MIMBTU CALCULATED			
STDUNIT	LB/MMBTU	D.18MAMBTU	O.005 LB/MAMBTU	0.005 LB/MMBTU
MISS	0.013	0.005	0.005	0.005
STDE EMISLIMIT1AVG MISS TIMECONDITION LIMIT	SEE NOTES			
EMISLIMIT 1UNIT	.23 LB/H	0.005 LB/MMBTU	0.005 LBAAMBTU	0.005 LB/MMBTU
EMIS E	1.23	. 0.005	0.005	0.0051
	LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GRYDSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GRY100 BOCF H2S AND NO MORE THAN 5.0 GRY100 DSCF TOTAL S.	NONE INDICATED	NONE INDICATED	NONE INDICATED
PROCESSNOTES	EMISSION POINT NO. ORTHOI-H1.	**EMISSION POINT BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO MINDICATION IS PROVIDED AS TO WHICH IS PRIMARY FUEL. DESIGN **AMMETUR! AUTHORIZED RATED CAPACITY IS 1 MMBTUR! OPERATING LIMIT PER YEAR NOT TO EXCEED 6% OZ AS EXCEED 6% OZ AS GAS BY REQUIRED CEMS.	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LFG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 64.4 MMBTUH, BUT CAPACITY IS 1 MMBTUH, OPERATING LIMIT PER YEAR IS NOT TO EXCEED 8" OZ AS MEASURED IN EXHAUST GAS BY RECUIRED CEMS.	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 56 MMBTU/H BUT AUTHORIZED RATED 56 MMBTU/H, CAPACITY IS 1 MMBTU/H.
THRUPUT	96.23 MMBTU/H	ММВТ U/H	мжати/н	MMBTU/H
THRU	96.23	98.9	64.4	56
PROCESSNAME	ORTHOXYLENE I HEATER	HYDROCHACKER RECYCLE GAS HEATER, H001	HYDROCRACKEH STABILIZER REBOILER, H404	HOT OIL HEATER, H609
FACILITYNAME	LYONDELL - CITGO REFINING, LP ORTHOXYLENE I HEATER	KENAI REFINERY	KENA! REFINERY	AK-0037 KENAI REFINERY
RBLCID	TX-0375	AK-0037	AK-0037	AK-0037

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/22007
And Process Type Conteins "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Geseous Fuel & Geseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Perticulate Matter

RBLCID	RBLCID FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT EN	STDE EMISLIMIT1AVG MISS TIMECONDITION LIMIT	STDE   MISS   STDUNIT LIMIT   LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	#1 REHEATER STARTUP BURNER, H1102	1,65	1.85 MMBTU/H	*SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS, NO INDICATION IS PROVIDED AS TO WHICH IB THE PRIMARY FUEL. DESIGN CAPACITY IS 1.65 MMBTU/H.	NONE INDICATED	0.005	0.005 LBAMMBTU		0.005 LB/MMBTU	
AK-0037	KENAI REFINEHY	#3 REHEATER STARTUP BURNER, H1104	1.05	1.05 MMBTU/H	- HORE 4 HOS	NONE INDICATED	0,005	0.000		0.005 LB/MMBTU	
AK-0037	AK-0037 KENAI REFINERY	#4 REHEATER STARTUP BURNER, H1106	9		SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL, DESIGN CAPACITY IS 1.90 MMBTU/H.	NONE INDICATED	0.005	0.005 LB/MMBTU		0.005 LB/MMBTU	
AK-0037	KENAI REFINERY	РОЖЕЯ РОВНЕЯ РОВНЕМТЕВ, Н201	31.8	.8 MMBTU/H	DESIGN CAPACITY IS 31.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. "SOURCE BURN'S NATURAL IGAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	NONE INDICATED.	0.005	0.005 LB/MMBTU		0.005[LB/MMBTU	
AK-0037	AK-0037 KENAI REFINERY	POWERFORMER PREHEATER, H202	72	ммвтци	*SOURCE ALSO BURNS REFINERY GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 51.0 MMBTU/H, BUT AUTHORIZED RATED SI IMMBTU/H, CAPACITY IS 1 MMBTU/H,	NONE INDICATED.	0.005	0.005 LEVAMMETU	J	0.005 LB/MMBTU	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1967 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutent: Perticulate Matter

Module 6 - Fischer-Tropsch and Product Upgrade

		1	
STDLIMIT AVGTIME CONDITION			
STDUNIT	LB/MMBTU	0,005 LB/MMBTU	D.005 LB/MMBTU
STDE MISS LIMIT	0.005	0.005	0.005
STDE EMISLIMIT1AVG MISS TIMECONDITION LIMIT			
EMISLIMIT 1UNIT	0.005 LB/AMBTU	0.005 LB/MMBTU	UTBWWBTU
EMIS E	0.005	0.005	71500'0
CTALDESC	NONE INDICATED.	NONE INDICAŢED.	NONE INDICATED.
PROCESSNOTES	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY, DESIGN CAPACITY IS 27.9 MMSTUM, BUT AUTHORIZED RATED 27.9 MMSTUM, CAPACITY IS 1 MMSTUM.	SOURCE BURNS NATURAL GAS, AND LIQUID PETROLEUM GAS. AND LIQUID PETROLEUM GAS. NO INDICATION IS GIVEN AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 3.8 MMBTUH, AUTHORIZED RATED CAPACITY IS 1 MMBTUH. FUEL IS NOT SPECIFIED. OPERATING LIMIT PER YEAR NOT TO EXCEED 7%, O2 AS MEASURED IN EXHAUST GAS BY CEMS.	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 48.8 MMBTUH BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUH. NOT TO EXCEED 7% OZ AS MGASURED IN EXHAUST A8.8 MMBTUH GAS BY REQUIRED CEMS.
THRUPUT	MAMBTU/H	53.8 MMBTU/H	HÜLLE
THAU	27.9	53.8	4 8.
PHOCESSNAME	РОЖЕЯ РАЕНЕАТЕВ, 14203	POWERFORMER REHEATER, H204	РОЖЕНБОЯМЕН ВЕНЕАТЕР, Н205
FACIUTYNAME	KENA! REFINERY	REFINERY	REFINERY
RBLCID FACILI	AK-0037 KENA	AK-0037 KENAI REFINERY	AK-0037 KENAI REFINERY
뿐	¥	¥ ¥	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or tess); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Particulate Matter

1									21	12010	Ş	TOTAL
RBLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT		CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMITIAVG MISS TIMECONDITION LIMIT		STDUNIT A	AVGTIME CONDITION
AK-0037	KENAJ REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H402	8	38 MMBTU/H		NONE INDICATED.	0.005	E/MMBTU			BTU.	
AK-0037	KENAI REFINERY	HYDROCRACKER FRACTIONATER REBOILER, 1403	OS.	50 MMBTU/H		NONE INDICATED.	900'0	OCOS LEMMBTU		0.005 LEXMMBTU	WMBTU	
AK-0037	KENAI REFINERY	HESIDUAL OIL HEATER, H612	23 23 24	22.2 MMBTU/H		NONE INDICATED.	0.003	0.005 LB/MMBTU		0.005 LB/MMBTU	MMBTU	
	AK-0087 KENAI REFINERY	FIRED STEAM GENERATOR, H701	36.55	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; IT IS NOT SPECIFIED WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 36.55 MMBTUH BUT AUTHORIZED RATED 36.55 MMBTUH CAPACITY IS 1 MMBTUH.	NONE INDICATED.	0.005	0.005 LB/MIMBTU		0.005 LB/AMMBTU	MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Particulate Matter

			THRU	THRUPUT			EMIS	TIMI	EMISLIMIT EMISLIMIT1AVG MISS		STI STDUNIT AVC	STDLIMIT AVGTIME
RBLCID	FACILITYNAME	PROCESSNAME	PUT	LINIT	PROCESSNOTES	CTALDESC		1UNIT	TIMECONDITION	LIMIT (LIMIT	•	CONDITION
AK-0037	KENAI BEFINERY	FIRED STEAM GENERATOR, H702	36.55	SS MARTU/H	'SOUNCE BÜRNS NATURL (GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 36.55 MIMBTURH BUT AUTHORIZED RATED	NONE INDICATED.	5000	UTSWAMSTU		0.005	B/AM/RTU	
AK-0037	KENAI REFINERY	NATURAL GAS SUPPLY HEATER, H704	0			NONE INDICATED.	0.005	г вумивти		0.005 LBA	ГВАМИВТО	
AK-0037	KENAI REFINERY	FIRED STEAM GENEHATOR, H801	ಜ	32 MMBTU/H	*SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS QS AMBTUM, BUT THIS AUTHORIZED MARED CAPACITY IS 1 MMBTUM.	NONE INDICATED.	0.005	UTBWWMBTU		O.OOS LEVMMBTU	WIBTU	
AK-0037	KENAI REFINERY	HOT GLYCOL HEATER, H802	10.8	10.8 MMBTU/H		NONE INDICATED.	0.005	0.005 LB/MMBTU		6.005 LB/MM8TU	WBTU	
Ŀ	AK-0037   KENA! REFINERY	REACTION FURNACE BURNER, H1101		MMBTU/H	SOURCE BURNS NATURAL (GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 5.2 MMBTUK, BUT AUTHORIZED RATED 5.2 MMBTUM, CAPACITY IS 1 NAMSTUM.	NONE INDICATED.	0.005	0.005 LEMMBTU		0.005 LB/MMBTU	IMBTU	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Perticulate Matter

ABLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	STDE EMISLIMIT1AVG MISS TIMECONDITION LIMIT	STDE MISS STDUI LIMIT LIMIT	Ę	STDLIMIT AVGTIME CONDITION
AK-0037	KENAJ REFINERY	#2 REHEATER STARTUP BURNER, H1103	1.15	MWBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.15	NONE INDICATED.	0.005	0.005 LEWMETU		0.005 LB/MMBTU	JUMBTU.	
AK-0037	KENAI REFINERY	TAIL GAS BURNER, H1105	N	ММВТОЛН	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY OF 2 MMBTUM SOURCE IS 2.00 MABTUM.	NONE INDICATED.	0.003	0.005 LB/MMBTU		0.005 LB/MMBTU	UMBTU	
AK-0037	KENAI HEFINEHY	PRIP ABSORBER FEED FURNACE, H1201/1203	10.4	MMBTUR	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIGUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.4 NAMBTUM. BUT AUTHORIZED RATED 0.4 MMBTUM. GAPACITY IS 1 MMBTUM.	NONE INDICATED.	0.005	0.005 LE/MANBTU		0.005 LB/MMBTU	UTBMI	
AK-0037	, KENA! REFINERY	PRIP RECYCLER H2 FURNACE, H1202	. 2.1	1.2 MMBTU/H		NOWE INDICATED.	0.005	0.005 LB/MMBTU		0.005 LB/MM8TU	WBTU	
AK-0037	AK-0037 KENAI REFINERY	VACUUM TOWER HEATER, H1701	6	MMBTU/H	"SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 91	NONE INDICATED.	0.005	0.005 LE/MMBTU		0.005 LB/MMBTU	·	

Ohio River Clean Fuels, LLC

HBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Conteins "13.3"; Commercial/Institutional-Size Boilers/Furnaces (100 million Btw/H or less); Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

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ABLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS	EMISLIMIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS ST LIMIT LIN	STDUNIT A	STDLIMIT AVGTIME CONDITION
AK-0037	AK-0037 KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E1400	36.5	36.5 MMBTU/H		NONE INDICATED.				0.014 LB/MMBTU	<del></del>	
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E1410	36.5	MMBTU/H	"SOURCE BURNS NATURAL GAS, DESEL, AND LPG, NO INDICATION IS PRIMARY FUEL, SCC CODE PROVIDED HERE IS APPLICABLE TO NATURAL GAS, DESIGN CAPACITY IS 38.5 MMBTU/I.	NONE INDICATED.				0.014 LBMMBTU	UMBTU	
PA-0231	UNITED REFINERY CO.	FCC FEED HYDROTREATER HEATER	. 66	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J. Subpart GGG, Subpart GCC. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESTAP requirements in 40 CFR 61 IS Subpart FF.	GOOD COMBUSTION PRACTICE	0.0	LB/H		0.001	Catci Using 0.001 LB/MMBTU linput	Calculated using heat input
LA-0121	CONVENT REFINERY	H-OIL TRANSPORT HEATER	21	MMBTU/H	21 MMBTU/H EMISSION POINT 70H-501	GOOD COMBUSTION PRACTICES	0.16 LB/H	LB/H		0.02 LB	0.02 LB/MMBTU	
LA-0121	CONVENT REFINERY	H-OIL ATM, TOWER HEATER	29.4	MMBTU/H	29.4 MMBTU/H EMISSION POINT 70H-301.	GOOD COMBUSTION PRACTICES	0.22 LB/H	H/B)		0.02 LB	0.02 LB/MMBTU	
LA-0128	CONVENT REFINERY	HTU-1 KEROSENE CHARGE HEATER	88	ММВТОЛН	68 MMBTU/H EMISSION POINT 3F-402	GOOD COMBUSTION PRACTICES	0.49 LB/H	L8/H		0.02 LB	0.02 LB/MMBTU	
.LA-0211	LA-0211 GARYVILLE REFINERY	NAPHTHA HYDROTREATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HOU TRAIN 182 REACTOR CHARGE HEATERS (11- 08 & 12-08)			5-08: 75.7 MMBTU/H 9-08: 73.8 MMBTU/H 11-08: 85.05 MMBTU/H 12-08: 85.05 MMBTU/H	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.008	3-HOUR 0.008 LBMMBTU AVERAGE	3-HOUR AVERAGE

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/22007
And Process Type Contains "13.3"; Commerciat/Institutional-Size Boliers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Poilutent: Particulate Matter

	-			***************************************				***************************************				
CiO	FACILITYNAME	E SANGE CO	THRU	THRUPUT	SHOUSSHOOL	CORRE	EMIS	EMISLIMIT	EMISLIMITIAVG MISS S	STDE   MISS   STDUNIT		STDLIMIT AVGTIME
·LA-0213	'LA-0213 ST. CHARLES REFINERY	HEATERS 2004-1 - 2004-4, 2005-4, 2005-8, 2005-9, 2005-8, 2005-36, RESOJIERS 2005-5, 2005-6, 2005-7, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 2005-12, 20			2004-1: 86 MAM BTUHR 2004-3: 52 MAM BTUHR 2004-4: 86 MAM BTUHR 2004-4: 86 MAM BTUHR 2005-4: 95 MAM BTUHR 2005-5: 95 MAM BTUHR 2005-8: 95 MAM BTUHR 2005-8: 95 MAM BTUHR 2005-8: 95 MAM BTUHR 2005-8: 95 MAM BTUHR 2005-8: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 95 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 15 MAM BTUHR 2005-3: 1		0.0074	JT8	ANNUAL AVERAGE			
"LA-0213	ST. CHARLES REFINERY	CPF HEATER H-30-03, H-39-01, & H-39- 02 (94-28, 94-29, & 94-30)			H-30-03: 68 MM BTU/HR H-39-01: 75 MM BTU/HR H-39-02: 90 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASECUS FUELS	0.0074	ANNUAL 0.0074 LBAMM BTUAVEHAGE	ANNUAL AVERAĞE			
*LA-0213	1-A-0213 ST. CHARLES REFINERY	F-33-05 (94-21)	48	ммвти/н	SOURCE ALSO FIRES 48,MMBTU/H NATURAL GAS.	PHOPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.56	L8/H	HOUBLY MAXIMUM		MARIA MA MARIA	
LA-0193	STYRENE MONOMER PLANT	REGENERATION GAS HEATER HS-2102	14.4	4 ММВТИ/Н		USE OF CLEAN BURNING FUELS (NATURAL GAS)	0.11 LB/H		HOURLY MAXIMUM	0.01 LB/MMBTU	BTU AVE	ANNUAL AVERAGE
LA-0193	STYRENE MONOMER PLANT	PEB RECOVERY COLUMN HEATER HS- 2105	25.2	.2 MMBTU/H		USE OF CLEAN BURNING FUELS (NATURAL GAS)	0.19 LB/H		HOURLY MAXIMUM	0.01 LB/MMBTU	BTU AVE	ANNUAL AVERAGE
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT CHARGE HEATER	70	THIS ( BY EQ 70 MMBTU/H (10200	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 10200		0.0075	0.0075 LB/MMBTU	THREE-HOUR AVG	0.008 LB/MMBTU	UTB	
AZ-0046	ARIZONA CLEAN FUELS YUMA	NAPHTHA HYDROTREATER CHARGE HEATER	21.4	THIS L BY EQ -4 MMBTU/H 04200	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 04200		0.0075	0.0075 LB/MMBTU	THREE-HOUR AVG	0.008 LB/MMBTU	UTB	
AZ-0046	AZ-0046 ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT DEBUTANIZER REBOILER	23.2	2 MMBTU/H	THIS EQUIPMENT IDENTIFIED BY 10 # 8-05609		0.0075	B/MMBTU	0.0075 LB/MMBTU 3-HR AVERAGE		<del></del>	NOT AVAILABLE
AZ-0046	AHIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTHEATEH CHARGE	25	25 MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # 8-08200		0.0075	B/MMBTU	0.0075 LB/MMBTU 3-HR AVERAGE	0.008 LB/MMBTU	UTB	
AZ-0048	ARIZONA CLEAN FUELS YUMA	DELAYED COKING UNIT CHARGE HEATER NOS. 1 AND 2	99.5	MMBTU/H	THESE TWO PEICES OF EQUIPMENT ARE IDENTIFIED BY ID #S B-		0.0075	.B/MMBTU	0.0075 LB/MMBTU 3-HR AVERAGE	0.008 LB/MMBTU	DT8	
AZ-0046	ARIZONA CLEAN FUELS YUMA	SPRAY DRYER HEATER	44	44 MMBTUAH	EQUIPMENT IDENTIFIED BY ID # E-26502		0.0075	B/MMBTU	0.0075 LB/MMBTU 3-HR AVERAGE	0.008 LB/MMBTU	DTO	
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER STABILIZER REPOILER HEATER	20	го ммвтилн			0.2	0.2 LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 HYDROTREATER REBOILER HEATER	32.7	.7 MMBTU/H			H/81 SE'0	B/H				
TX-0395	DIAMOND SHAMHOCK MCKEE	NO. 1 REBOILER STABILIZER REBOILER HEATER	45.7	45.7 MMBTU/H			0.49 LB/H	B/H				

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Pormit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

						-			STDE	STDLIMIT
			윤	THRUPUT			EMIS	EMISLIMIT (	EMIS EMISLIMIT EMISLIMITIANG MISS STDUNIT AVGTIME	AVGTIME
RBLCID  FACILITYNAME	TYNAME	PROCESSNAME	5	LIND	PROCESSNOTES	CTRLDESC	LIMIT	LIMIT1 10NIT	TIMECONDITION LIMIT LIMIT	CONDITION
					UNIT DESTROYS VAPORS				l	
					CREATED BY THE					
				_	THERMAL DRYING UNT,					
					WHICH HEATS SOLIDS					
					SEGREGATED FROM					
		THERMAL DRYING UNIT HEATEC			WASTEWATER BY THE API			-		
"LA-0211 GARYVILLE REFINERY	ILLE REFINERY	HEATER (124-1-91)	9.6	MM BTU/H	.6 MM BTUM SEPARATORS.					

December 2007

Ohio River Clean Fuels, LLC

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/22007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO<sub>2</sub>)

RBLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PHOCESSNOTES	CTRLDESC	EMIS	EMISUMIT	STDE EMISLIMITIAVG MISS TIMECONDITION LIMIT	STDE	STDUNIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H205	48.8	48.8 MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROCEUM GAS, NO INDICATION IS PRIMARY. DESIGN CAPACITY IS 48.8 MMRATUM BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUM. NOT TO EXCEED 7% OZ AS MOT TO EXCEED 7% OZ AS MGAS BY REQUIRED CEMS.	A PROHATED CONCENTRATION OF THE FOLLOWING FUEL LIMITS IS CONSIDERED BACT: DIESEL FUEL, 0.35% SULFUJS; NATURAL GAS, 0.01% SULFUR; LPG, 0.07% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AZ-0046	ARIZONA CLEAN FUELS YUMA	DELAYED COKING UNIT CHARGE HEATER NOS. 1 AND 2	99.5	99.5 MMBTU/H	THESE TWO PEICES OF EQUIPMENT ARE IDENTIFIED BY ID #S B- 14110A AND B-14110B	FUEL LIMITED TO 35 PPM S.		35 PPMV	DAILY AVERAGE			NOT AVALLABLE
AK-0037	KENAI REFINERY	#1 REHEATER STARTUP BURNER, H1102	1,65	H/DT8MMBTU/H	'SOURCE BURNS MATURAL GAS, LPG, AND REFINERY GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.65 MMBTURI.	FUEL SULFUR CONTENT IS LIMITED ACCORDING TO THE FOLLOWING: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% H2S; NATURAL GAS, 0.01% H2S; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES		·	
AK-0037	KENAI REFINERY	RESIDUAL OIL HEATER, H612		ММВТИЛН	SOURCE BURNS NATURAL GAS AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 22.2 MMBTUM BUT AUTHORIZED RATED CAPACITY IS 1 MABTUM. OPERATING LIMIT PER 22.2 MMBTUM YEAR IS 125 HOURS.	FUEL SULFUR CONTENT IS LIMITED AS FOLLOWS: DIESEL FUEL, 0.35%, SULFUR; NATURAL GAS, CORN, SULFUR; LPG, 0.01%, SULFUR; REFINERY GAS,			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	HOT GLYCOL HEATER, H802	10.8	ммвти/н	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED BIESEL FUEL, 0.35% AS TO WHICH IS THE SULFUR, NOTHARY FUEL. DESIGN CAPACITY IS 1.08 MMBTU/H DETROLEUM GAS, 0.01% BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR, REFINERY GAS, 0.08 BUT AUTHORIZED RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR RATEO SULFUR	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01%, SULFUR; LICUIFED PETROLEUM GAS, 0.01%, SULFUR; REFINERY GAS,			SEE POLLUTANT NOTES		·	

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/12/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Boliers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO<sub>2</sub>)

FACILITYNAME		PROCESSNAME	THR.	THRUPUT	PROCESSNOTES	CTRLDESC	EMIS E	EMISLIMIT 1UNIT	STDE STAINT EMISLIMIT1AVG MISS TUNIT TIMECONDITION LIMIT	STDE MISS STDUNIT LIMIT LIMIT	F	STDLIMIT AVGTIME CONDITION
KENA	AK.0037 KENAI REFINERY	FIRED STEAM GENERATOR, H801	32	92 MMBTU/H		FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01%, SULFUR; LICUIFIED PETROLICUM GAS, 0.01% SULFUR; REFINERY GAS,	900 PPM		AVERAGED OVER 3 HOURS			·
AK-0037 KENA	KENAJ REFIN <u>E</u> RY	#3 REHEATER STARTUP BURNER, H1104	1.05	H/UTBMM	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROFE AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.05 MMBTUIH.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LICURIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 188 PPMY H2S.			SEE POLLUTANT NOTES			
AK-0037 KENA	KENA! REFINERY	TAIL GAS BURNER, H1105		2 MMBTU/H	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIGUO PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. ISEGIN CARACITY OF SOURCE IS 2.00 MMBTURI.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIOUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
KEN	KENAI REFINERY	#4 REHEATER STAHTUP BURNER, H1106		ММВТИН	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL, DESIGN CAPACITY IS 1,90 CAPACITY IS 1,90	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIRIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS,			SEE POLLUTANT NOTES			
X MIN	AK-0037 KENAI REFINERY	PRIP RECYCLER HZ FURNACE, H1202	1.2	ММВТИН	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETHOLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 11.2 MMBTUM. BUT AUTHORIZED RATED 11.2 MMBTUM. CAPACITY IS 1 MMBTUM.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 188 PPMY HZS.			SEE POLLUTANT NOTES			

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3": Commerciat/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutent: Sulfur Dioxide (50<sub>2</sub>)

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STDLIMIT AVGTIME CONDITION		ASSUMED		
STDUNIT	ſ	SOO PPIM @ 15915% O2		,
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EMIS E				
	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.33% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIRED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; LAUFIED SULFUR; LAUFIED PETROLLEUM GAS, 0.01% SULFUR; REPINERY GAS, 168 PPMV H.S.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR, NATURAL GAS, 0.01% SULFUR, LPG, 0.01% 0.10% SULFUR, PERINERY GAS 188 PPMV H2S.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR: NATURAL GAS, 0.07% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS,
PROCESSNOTES	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 91 MMBTU/H.	BURINS NATURAL ID PETROLEUM DIESEL NO DIESEL NO ICH FUEL IS SOC AND CODES ARE CODES ARE LE WHEN NATURAL GAS. SIN CAPACITY IS SUMR AND THE COPACITY IS TO CAPACITY IS TO CAP	GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS, AND LIQUID PETROLEUM GAS; AND INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 5.2 MMBTUH, BUT CAPACITY IS 1.3 1 MMBTUH.	**SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS SO MABTUH, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUH, OPERATING LIMIT PER YEAR NOT TO EXCEED 6% OZ AS MEASURED IN EXHAUST GAS BY SO MMBTUH RECUIRED CEMS.
THRUPUT UNIT	91 MMBTUM	ММВТ U/H	5.2 MMBTU/H	MMBTU/H
THRU	. 6	96.5	: : : :	os
PROCESSNAME	VACUUM TOWER HEATER, H1701	DUCT BURNER FOR STEAM GENERATION, E-1400	REACTION FURNACE BURNER, H1101	HYDROCRACKER FRACTIONATER REBOILER, H403
HBLCID FACILITYNAME	AK-0037 KENAI REFINERY	AK-0037 KENAI REFINERY	AK-0037 KENAI HEFINERY	AK-0037 KENAI REFINERY

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Sulfur Dioxide (SO<sub>2</sub>)

RBLCID												
	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS E	EMISUMIT 1UNIT	STDE EMISLIMIT1AVG MISS TIMECONDITION LIMIT	STDE MISS LIMIT	STDUNIT	STDLIMIT AVGTIME CONDITION
	KENA! REFINERY	HYDROCRACKER STABILIZER REBOILER, H404	64.4	64.4 MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LPGS, NO MUDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 44, MMBTUJH, BUT AMADTUH, BUT CAPACITY IS 1 MMBTUH, OPERATING LIMIT PER YEAR IS NOT TO EXCEED YEAR IS NOT TO EXCEED YEAR IS NOT TO EXCEED EXCHAUST GAS BY REQUIRED CEMS.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR, NATURAL GAS, 50.01% SULFUR; LPG, 0.01% SULFUR; REPINERY GAS, 168 FPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENA! REFINERY	#2 REHEATER STARTUP BURNER, H1103	1.15	.1s MMBTU.	SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. IS THE PRIMARY FUEL. DESSIGN CAPACITY IS 1.15	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR, NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFNERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES		·	
AK-0037	AK-0037 KENAI REFINERY	PRIP ABSORBER FEED FURNACE, H1201/1203	10.4	0.4 MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LICUID PETROLEUM GAS; AND INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.4 MMBTUH, BUT GAPACITY IS 1 MMBTUH.	FUEL SULFUR CONTENT UMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01%, SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
	AK-0037 KENA! REFINERY	DUCT BURNEH FOR STEAM GENERATION, <u>E-1410</u>	36.55	MABTUM	*SOURCE BURNS LIQUID PETROLEUM GAS, NATURAL GAS, AND DIESEL. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. OPERATING LIMIT FOR THE COMBINATION OF THE COLAR GENTAUR THENE SOLAR GENTAUR THENE & DUCT BURNER WHEN BURNING DIESEL FUEL IS 438 H PER YEAR, SCC AND PROCESS CODES ARE APPLICABLE WHEN BURNING NATURE GAS. THE DESIGN CAPACITY IS 36.5 MMBTUM 36.5 MMBTUM.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUEFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.				500 6	ASSUM @ 15% 15% 02	ASSUMED @

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/22007
And Process Type Contains "13.3"; Commerciat/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Conteins 'Heater'
Pollutant: Sulfur Dioxide (SO<sub>2</sub>)

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Poliuant: Sulfur Dioxide (SO<sub>2</sub>)

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			THE S	THRUPUT			EMIS	MIT	EMISLIMIT1AVG MISS		AVGTIME
TX-0375		LYONDELL - CITGO REFINING, LP BTU- NO.3 REACTOR FEED HEATER		MMBTU/H	EMISSION POINT NO. BTU-HF105.	ir o o A		LB/H	IMECONDI	GONDITION CONDITION CONDITION CONDITION	CONDITION
7X-0375		LYONDELL - CITGO REFINING. LP BTU-NO.2 REACTOR FEED HEATER	89.69	ММВТШН	EMISSION POINT NO. BTU- HF104	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GRVDSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.26 GR/100 BOSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.8 [.	ГВ/H		O.025 LB/MMBTU CALCULATED	J CALCULATED
TX-0375		LYONDELL - CITGO REFINING, LP ISOM II EAST REACTOR FEED HEATER	·	25 MMBTU/H	EMISSION POINT NO. ISOMII-F5.	LOW S FUEL: FUEL GAS WITH HES CONTENT NO MORE THAN 0.1 GRUSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH HES CONTENT NO MORE THAN 0.25 GR/100 BOSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/100 DSCF.	1.9	гр.		0.025 LB/MMBTU CALCULATED	CALCULATED
TX-0375	ISOM II C	ISOM II COMBINATION SPLITTER HEATER	59.77	77.62 MMBTUIH		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GRVDSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 BOSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	77 2	ГВ/H		0.026 LB/MMBTU CALCULATED	CALCULATED
TX-0375	ISOM II XYLENE HERUN TOWER	ISOM II XYLENE RERUN TOWER HEATER	83,7	.7 MMBTUIH		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GRUDSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	2.2 LB/H	H/8		0.028 LB/MMBTU CALCULATED	JCALCULATED

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Data Between 1/1/1997 And 1/1/12/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Boilers/Furnaces (100 million BtwH or less); Gaseous Fuel Mixtures
And Process Contains "Haster"
Pollutant: Sulfur Dioxide (\$C<sub>2</sub>)

RALCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT	PHOCESSNOTES	·	EMIS E	EMISLIMIT I	EMISLIMIT1AVG MISS TIMECONDITION LIMIT		Ę	STDLIMIT AVGTIME CONDITION
1 37X-0375	LYONDELL - CITGO REFINING, LP ORTHOXYLENE I HEATER		96.23	23 MMBTU/H		LOW SULFUR CONTENT FUEL. USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GRUDSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF THAN 5.0 GR/100 DSCF TOTAL S.	, , ,	18H		0.0261.8/8	MABTU	0.026 LBYMMBTU CALCULATED
LA-0149_1	LOUISIANA REFINING DIVISION	LGO HYDROCARBON CHARGE HEATER	4	MMBTU/H	THE PERMIT INDICATES HEATERS MAY BURN NATURAL GAS, REFINERY GAS, OR A COMBINATION OF THE TWO.	LOW SULFUR FUEL	2.78 LB/H	B/H		0.04 LB/N	MMBTU	0.04 LBMMBTU CALCULATED
LA-0149 I	LOUISIANA REFINING DIVISION	HGO HYDROCARBON STRIPPER REBOILER	78.	H/DT8MW	THE PERMIT INDICATES HEATERS MAY BURN NATURAL GAS, REFINERY GAS, OR A COMBINATION 18 MAMBTUM OF THE TWO.	LOW SULFUR FUEL	3.13 LB/H	H/B		0.04 LB/M	MMBTU C	0.04 LBMMBTU CALCULATED
LA-0149	LOUISIANA REFINING DIVISION	LGO HYDROCARBON STRIPPER REBOILER	62.1	62.1 MMBTU/H		LOW SULFUR FUELS	2.49 L	LB/H		0.04 LB/A	WMBTU C.	0.04 LB/MMBTU CALCULATED
LA-0149 1	LOUISIANA REFINING DIVISION	HGO HYDROCARBON CHARGE HEATER		98.8 MMBTU/H		LOW SULFUR FUELS	3.95	LB/H		0.04 LB/h	WMBTU C.	0.04 LB/MMBTU CALCULATED
PA-0231	UNITED REFINERY CO.	FCC FEED HYDROTREATER HEATER	ъ.	MMBTU/H	or the wart J, ant OQC. ect to 40 CFR NESHAP	LOW SULFUR REFINERY GAS	2.44	H/811		0.027 LB/N	C3 US LB/MMBTU Ing	Calculated using heat
AK-0037 H	KENA! HEFINERY	HOT OIL HEATER, H609	56,1	MMBTUTH	EFINERY D OVIDED HE ESIGN MBTU/H P RATED	NONE INDICATED. SOURCE IS NOT SUBJECT TO BACT. PSO BECAUSE IT WAS INSTALLED PRIOR TO 1975.						
AK-0037 K	KENAJ REFINERY	FIRED STEAM GENERATOR, H701	36.55 1	MATUM	*SOURCE BURNS REFINERY GAS, NATURAL GAS, ND LIQUID PETROLEUM GAS, IT IS NOT SPECIFIED WHICH FUEL IS PRIWARY. DESIGN CAPACITY IS 36.55 MANBTUM BUT AUTHORIZED RATED TEMPORIZED RATED	NONE INDICATED. THIS SOUPCE IS NOT SUBJECT TO BACT-PSD AS IT WAS INSTALLED PRIOR TO 1975.						

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/12/2007
And Process Type Contains "13.3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Btu/H or less); Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutent: Sulfur Dioxide (SO<sub>2</sub>)

		1-1-1	STREET, SQUARE,	Marie de Sandresse de Santonio	***************************************		The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	***************************************	Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction of the Contraction o	 	
ABLCID	FACILITYNAME	PROCESSNAME	THRU	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS E	EMISLIMIT I	EMISLIMIT1AVG MISS TIMECONDITION LIMIT	STDUNIT A	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H702.	36.55	MMBTU/H	S NATURL SAS, AND 1ON IS 1 WHICH FUEL. Y IS 36.55 TED MBTU/H,	NONE INDICATED. THIS SOURCE IS NOT SUBJECT TO BACT-PSD AS IT WAS INSTALLED PRIOR TO 1975.					
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT DEBUTANIZER REBOILER	23.2	MMBTU/H	309	S LIMIT OF 35 PPM.	35 F	) VMGd	DAILY AVERAGE	∠ <b>4</b>	NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	NAPHTHA HYDROTREATER CHARGE HEATER	21,4	21.4 MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 04200	S LIMITED TO 35 PPM	35.	) NMdd	OAILY AVERAGE	Zď	NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT CHARGE HEATER	70	ММВТИН	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B- 10200	S LIMITED TO 35 PPM.	35.	35 PPMV	DAILY	_ Z <	NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER CHARGE HEATER	25	ммвти/н	25 MMBTU/H IDENTIFIED BY ID # B-08200 S LIMITED TO 35 PPM	S LIMITED TO 35 PPM.	35 F		DAILY AVERAGE	24	NOT AVAILABLE
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H202	n F	51 MMBTU/H	URNS ND JM GAS, S WHICH DESIGN TED	SOURCE IS NOT SUBJECT TO FUEL LIMITATIONS UNDER BACT-PSD BECAUSE IT WAS INSTALLED PRIOR TO 1975.	· · · · · · · · · · · · · · · · · · ·				
AK-0037	KENA! REFINERY	POWEHFORMER PREHEATER, H203	27.9	27.9 MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, NAT LIGUID GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY, DESIGN CAPACITY IS 27.9 MMRHTUH, BUT AUTHORIZED RATED CAPACITY IS 1, MMRTUH.	SOURCE WAS INSTALLED PRIOR TO 1975 AND IS THEREFORE NOT SUBJECT TO PSD.		·			
AK-0037	AK-0037 KENAI REFINERY	POWERFORMER PREHEATER, H201	31.8	МВТИМ	DESIGN CAPACITY IS 31.8 MM8TUM BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUM. 'SOUNCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH 31.8 MMBTUM IS THE PRIMARY FUEL.	SOURCE WAS INSTALLED PRIOR TO 1975 SO JT IS NOT SUBJECT TO BACT. PSD.					

Module 6 - Fischer-Tropsch and Product Upgrade

RBLC Matching Facilities for Search Criterie:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boliers/Furnaces (100 million Btw/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Conteins 'Heater'
Pollutant: Sulfur Dioxide (SO<sub>2</sub>)

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RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PHOCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISUMIT 1UNIT	EMISLIMIT EMISLIMITIAVG MISS 1UNIT TIMECONDITION LIMIT		STDUNIT A	STDLIMIT AVGTIME CONDITION
AK-0037	KENA! REFINERY	РОЖЕЯ РЕНЕАТЕЯ, H204	53.8	ММВТИН	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS GIVEN AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 3.8 MMBTUM, AUTHORIZED RATED CAPACITY IS 1 MMBTUM, FUEL IS NOT SPECIFIED. OPERATING LIMIT PER YEAR NOT TO EXCEED 7% OZ AS MEASURED IN EXHAUST 53.8 MMBTUM IGAS BY CEMS.	SULFUR CONTENT FUEL LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR, NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENA! REFINGRY	HYDROCRACKER RECYCLE GAS HEATER, H402	89	ММВТU/Н	* THIS SOURCE BURNS NATURAL GAS, LPG AND REFINERY GAS, NO INDFORMATION IS PROVIDED AS TO WHICH FUEL TYPE IS PRIMARY. DESIGN CAPACITY IS 38 MMBTUM BUT AUTHORIZED RATED CAPACITY IS 1 MMBTUM, OPERATING LIMIT PER YEAR NOT TO EXCEED 6% OZ AS MEASURED IN EXHAUST GAS BY S8 MMBTUM REQUIRED CEMS.	THE FOLLOWING FUEL SULFUR CONTENT LIMITS ARE CONSIDERED BACT: DIESEL FUEL, 0.35% SULFUR, NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REPINERY GAS, 168 PPMV HZS.			SEE POLLUTANT NOTES			
"LA-0211	1.4-0211 GARYVILLE REFINERY	NAPHTHA HYDROTHEATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HOU TRAIN 182 REACTOR CHARGE HEATERS (11- 08 & 12-08)			5-08: 75.7 MMBTU/H 9-08: 73.8 MMBTU/H 11-08: 85.05 MMBTU/H 12-08: 85.05 MMBTU/H	USE OF LOW SULFUR REFINERY FUEL GAS	,			25 PP	ANNUAL 25 PPMV AS HAVERAGE	ANNUAL AVERAGE
-LA-0213	1.A-0213 ST. CHARLES REFINERY	F-33-05 (94-21)	84	ммвтил	SOURCE ALSO FIRES 48 MMBTU7H NATURAL GAS,	USE OF PIPELINE QUALITY NATURAL GAS OR REFINERY FUEL GASES WHA AN H2S CONCENTRATION LESS THAN 100 PPMV (ANNUAL AVERAGE).	1,08	1.08 LB/H	HOURLY MAXIMUM			

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Data Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13.3": Commerciat/Institutional-Size Bollers/Furnaces (100 million Btw/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutant: Sulfur Dioxide (\$0<sub>2</sub>)

Module 6 - Fischer-Tropsch and Product Upgrade

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			THRU THRUPUT			EMIS	EMISLIMIT	EMISLIMIT EMISLIMITIAVG	STDE STDUNIT	STDLIMIT
RBLCID	FACILITYNAME	PROCESSNAME			CTRLDESC	_	1UNIT	TIMECONDITION LIMIT	IMIT LIMIT	CONDITION
				2004-1: 86 MM BTU/HR 2004-						
				2: 24 MM BTU/HR 2004-3: 62					tetenense	
				MM BTU/HR 2004-4: 86 MM					ianmar	
				BTU/HR 2005-5: 95 MM					*********	
				BIU/HR ZOUS-6: 95 MM						
	,			BTU/HR 2005-7: 95 MM					nnnn	
				BTU/HR 2005-8; 95 MM						
				BTU/HR 2005-9: 42 MM					conne	
				BTU/HR 2005-12: 95 MM						
				BTU/HR 2005-23: 95 MM	USE OF PIPELINE QUALITY					
			•	BTU/HR 2005-24: 42 MM	NATURAL GAS OR					
				BTU/HR 2005-27: 95 MM	REFINERY FUEL GASES					
		HEATERS 2004-1 - 2004-4, 2005-4, 2005-		BTU/HR 2005-35; 38 MM	WITH AN H2S					
		8, 2005-9, 2005-23, 2005-24, 2005-35, &		BTU/HR 2005-35: 15 MM	CONCENTRATION LESS					
		2005-36; REBOILERS 2005-5, 2005-6,	-	BTU/HR SOURCES ALSO	THAN 100 PPMV (ANNUAL					
"LA-0213	"LA-0213 ST. CHARLES REFINERY	2005-7, 2005-12, 2005-27		FIRE NATURAL GAS.	AVERAGE).			SEE NOTE		
					USE OF PIPELINE QUALITY	ļ				
					NATURAL GAS OR					
				H-30-03: 68 MM BTU/HR H-	REFINERY FUEL GASES					
				39-01: 75 MM BTU/HR H-39-	WITH AN H2S					
				02: 90 MM BTU/HR	CONCENTRATION LESS					
		CPF HEATER H-30-03, H-39-01, & H-39-		SOURCES ALSO FIRE	THAN 100 PPMV (ANNUAL	-				
*LA-0213		02 (94-28, 94-29, & 94-30)		NATURAL GAS.	AVERAGE).			SEE NOTE		
	4D SHAMROCK MCKEE	NO. 1 REFORMER STABILIZER				-				
TX-0395		REPOILER HEATER	20 MMBTU/H			0.75 LB/H	H/H			
	4D SHAMROCK MCKEE	NO. 1 HYDROTHEATER REBOILER								
TX-0395	PLANT	HEATER.	32.7 MMBTU/H			1.23 LB/H	B/H			
	DIAMOND SHAMROCK MCKEE	NO. 1 REBOILER STABILIZER REBOILER								
TX-0395	PLANT	HEATER	45.7 MMBTU/H			1.72 LB/H	.в/н			
				EQUIPMENT IDENTIFIED BY						NOT
AZ-0046	SYUMA	SPRAY DRYER HEATER	44 MMBTUR	44 MMBTU/H ID # E-26502		35	^	DAILY AVERAGE		AVAILABLE
TX-0442	TX-0442 SHELL OIL DEER PARK	FOURTEEN HEATERS				300 PPM	Mdc			
				UNIT DESTROYS VAPORS						
				CREATED BY THE						
				THERMAL DRYING UNT.						
				WHICH REATS SOLIDS						
		C THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT OF THE CONTRACT		SECOND DE L'ORDES						
*****		I REHMAL DHYING ON!! REALEC	1	WASIEWAIEH BY INE API			AMARI			
- N-021	יבא-טבוו לפאשו אוררב הבהואבהו	nea (124-1-91)	S.o IMMBI O.F	S.O.MWBI O/M SEPARALONS.						

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "13,3"; Commercial/Institutional-Size Bollers/Furnaces (100 million Stu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains "Heater"
Pollutent: Volatile Organic Compounds (VOC)

			I Paranta						
RBLCID	FACILITYNAME	PROCESSNAME	THRU THRUPUT	JT PROCESSNOTES	CTRLDESC	EMIS EMISLIMIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS STDUNIT LIMIT LIMIT	STDLIMIT AVGTIME CONDITION
			***************************************	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart GGO, The unit is also subject to MACT standards in 40 CFR					
PA-0231	UNITED REFINERY CO.	FCC FEED HYDROTREATER HEATER	91 MMBTU	63 Subpart DC, and NESHAP requirements in 40 CFR 61 91 MMBTU/H Subpart FF.	GOOD COMBUSTION PRACTICE	0.49 LB/H			
TX-0375	LYONDELL - CITGO REFINING, LP	TX-0375 LYONDELL - CITGO REFINING, LP BENZENE STABILIZER HEATER	38.34 MMBTU/H H501	SION PT. NO. ARU-	NONE INDICATED	0.21 LB/H			
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.4 REACTOR FEED HEATER	49 MMBTU/H		NONE INDICATED	0.26 LB/H			
TX-0375	TX-0375 LYONDELL - CITGO REFINING, LP REBOILER	BTU-REFORMATE STABILIZER REBOILER	54,77 MMBTU/H HF107.	EMISSION POINT NO. BTU- PH HF107.	NONE INDICATED	0.3 LB/H			
TX-0375	LYONDELL - CITGO REFINING, LP	LYONDELL - CITGO REFINING, LP BTU- NO.3 REACTOR FEED HEATER	58.95 MMBTU/H HF105.	EMISSION POINT NO. BTU-	NONE INDICATED	0.32 L8/H			
				EMISSION POINT NO. BTU-		,			
TX-0375	LYONDELL - CITGO REFINING, LP	LYONDELL - CITGO REFINING, LP BTU-NO.2 REACTOR FEED HEATER	69.68 MMBTU/H HF104	/H  HF104	NONE INDICATED	0.38 LB/H			
TX-0375	LYONDELL - CITGO REFINING, LP	LYONDELL - CITGO REFINING, LP ISOM II EAST REACTOR FEED HEATER	75 MMBTU	75 MMBTU/H ISOMII-F5.	NONE INDICATED	0.4 LB/H			
TX-0375	LYONDELL - CITGO REFINING, LP HEATER	ISOM II COMBINATION SPLITTER HEATER	77,62 MMBTU/H	£	NONE INDICATED	0.42 LB/H			
	LYONDELL - CITGO REFINING, LP HEATER	ISOM II XYLENE REHUN TOWER HEATER	B3.7 MMBTU/H	Ŧ	NONE INDICATED	0.45 LB/H			
TX-0375	LYONDELL - CITGO REFINING, LP ORTHOXYLENE I HEATER	OHTHOXYLENE I HEATER	96.23 MMBTU	96.23 MMBTU/H OPTHOI-H1.	NONE INDICATED	0.52 LB/H			
.LA-0211	-LA-0211 GARYVILLE REFINERY	NAPHTHA HYDROTREATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HOU THAIN 1&2 REACTOR CHARGE HEATERS (11- 08 & 12-08)		5-08: 75.7 MMBTUH 9-08: 73.8 MMBTUH 11-08: 85.05 MMBTUH 12-08: 85.05 MMBTUH	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES			3-HOUR 0.002 LB/AMMBTU AVERAGE	3-HOUR AVERAGE
- - - - - -	1 A.0042 ST CHABIES BERNEDV	CPF HEATER H-30-03, H-39-01, & H-39-		H-30-03: 68 MM BTU/HR H- 39-01: 75 MM BTU/HR H-39- 02: 90 MM BTU/HR SOURCES ALSO FIRE NATHEN GAS	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASCOIN FIFTS	ANNUAL ANNUAL	ANNUAL		
.LA-0213	1.4-0213 ST. CHARLES REFINERY	F-33-05 (94-21)	48 MMBTU	SOURCE ALSO FIRES 48 MMBTUH NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GCOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.11 LB/H	HOURLY		
The Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the P				\$	,				

Ohio River Clean Fuels, LLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/1/2/2007
And Process Type Contains "19,3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutent: Volatile Organic Compounds (VOC)

Module 6 - Fischer-Tropsch and Product Upgrade

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RBLCID	RBLCID FACILITYNAME	PHOCESSNAME	PUT		PROCESSNOTES	CTRLDESC		TINO	TIMECONDITION LIMIT	LIMIT LIMIT	
					2004-1: 86 MM BTU/HR 2004-						
	-				2; 24 MM BTU/HR 2004-3; 52						
					MM BTU/HR 2004-4: 86 MM						
					BTU/HR 2005-5: 95 MM			_		**********	
					BTU/HR 2005-6: 95 MM						
					BTUILE SOOF, SO NIV						
-					BTU/HR 2005-9: 42 MM						
					BTU/HR 2005-12; 95 MM						<del></del>
			-		BTU/HR 2005-23; 95 MM						- 2-22-200
					BTU/HR 2005-24: 42 MM					aaama	<b></b>
					BTU/HR 2005-27: 95 MM	PROPER EQUIPMENT					<del></del>
		HEALEHS 2004-1 - 2004-4, 2005-4, 2005-				DESIGN AND OPERATION,					
		8, 2005-9, 2005-23, 2005-24, 2005-35, &				GOOD COMBUSTION					*******
		2005-36; REBOILERS 2005-5, 2005-6,			တ္သ	PRACTICES, AND USE OF					ANNUAL
*LA-0213	LA-0213 ST. CHARLES REFINERY	2005-7, 2005-12, 2005-27			FIRE NATURAL GAS.	GASEOUS FUELS				0.005 LB/MME	0.005 LB/MMBTU AVERAGE
		NO. 1 REFORMER STABILIZER									
TX-0395	TX-0395 PLANT	REPOILER HEATER	5	20 MMBTU/H			0.08 LB/H	LB/H			
		NO. 1 HYDROTREATER REBOILER									
TX-0395		НЕАТЕН	32.7	32.7 MMBTU/H			0.13 LB/H	LB/H			
	DIAMOND SHAMBOCK MCKEE	NO. 1 REBOILER STABILIZER REBOILER								-	
TX-0395	PLANT	HEATER	45.7	15.7 MMSTU/H		,	0.18 LB/H	LB/H			
					UNIT DESTROYS VAPORS						
		•		<del>-</del>	CREATED BY THE						
					WHICH HEATS SOLIDS						
					SEGREGATED FROM						
		THERMAL DRYING UNIT HEATEC			WASTEWATER BY THE API						
*LA-0211	*LA-0211 GARYVILLE REFINERY	HEATER (124-1-91)	9.6	MMBTU/H	9.6 MMBTU/H SEPARATORS.						

#### **BACT Analysis - Cost Evaluation**

#### Emission Control Cost Evaluation - Process Heater NO<sub>x</sub> Emissions

Definitions	
TIC	total capital installed cost
HQ	heater capacity (GJ/hr)
BQ	burner heat release rate (GJ/hr)
NB	number of burners
AOC	annual operating cost
CF	capacity factor expressed in decimal form
CRF	capital recovery factor = [i(1+i)n]/[(1+i)n-1]
0	
Conversions	
1.06	Gigajoules (GJ) = 1 million British Thermal Units (MMBtu)
1.00018	USD = 1 CAD (10/3/07 http://www.currencysource.com/tables/USD/1X_USD.htm)
1.416	Inflation Factor (2007 2nd Q. implicit price deflator / 1991 Average implicit price deflator)
1.233	Inflation Factor (2007 2nd Q. implicit price deflator / 1998 Average implicit price deflator)
	,
Assumption	<u>s</u>
\$6.28	Natural gas cost (USD/MMBtu - September 2007 per http://www.forecasts.org/natural-gas.htm)
0.1424	= CRF
119.532	Second Quarter 2007 USD implicit price deflator
96.9340	Average 1998 USD implicit price deflator
84.4398	Average 1991 USD implicit price deflator
	Mechanical draft process heater design
154	MMBtu/hr process heater
162.4777	= HQ
4	= NB (38.5 MMBtw/hr each)
. 50	horsepower motor for FGR
532.7	tons of ammonia required annually in SCR (NH <sub>3</sub> + NO <sub>x</sub> + O <sub>2</sub> $\rightarrow$ N <sub>2</sub> + H <sub>2</sub> O + CO <sub>2</sub> )
532.7	tons of annual uncontrolled NO <sub>x</sub> emissions
24	MMBtu/hr process heater
25.3212	= HQ
3	= NB (8 MMBtu/hr each)
8	horsepower motor for FGR
•	•
29.6	tons of ammonia required annually in SCR (NH <sub>3</sub> + NO <sub>x</sub> + O <sub>2</sub> $\rightarrow$ N <sub>2</sub> + H <sub>2</sub> O + CO <sub>2</sub> )
29.6	tons of annual uncontrolled NO <sub>x</sub> emissions
21	MMBtu/hr process heater
22.15605	= HQ
3	= NB (7 MMBtu/hr each)
8	horsepower motor for FGR
25.9	tons of ammonia required annually in SCR (NH <sub>3</sub> + NO <sub>x</sub> + O <sub>2</sub> $\rightarrow$ N <sub>2</sub> + H <sub>2</sub> O + CO <sub>2</sub> )
25.9	tons of annual uncontrolled NO <sub>x</sub> emissions
. 20	MMBtu/hr process heater
21.101	= HQ
3	= NB (6.67 MMBtu/hr each)
8	horsepower motor for FGR
24.7	tons of ammonia required annually in SCR (NH <sub>3</sub> + NO <sub>x</sub> + O <sub>2</sub> $\rightarrow$ N <sub>2</sub> + H <sub>2</sub> O + CO <sub>2</sub> )
24.7	tons of annual uncontrolled NO <sub>x</sub> emissions

#### References/Notes

Equations obtained from "Alternative Control Techniques Document - NO<sub>x</sub> Emissions from Process Heaters" USEPA September 1993.

Equations yield estimates in average 1990 CAD. Results have been converted to USD utilizing the current rate of exchange and scaled up for inflation from 1991 to 2007 USD.

TIC amounts have been adjusted by the CRF prior to CE calculation.

NB estimates based on API Recommended Practice 535 - "Burners for Fired Heaters in General Refinery Service" sec 4.1.7 - Burner Liberation Typical Sizes.

SCR ductwork equations obtained from "EPA Air Pollution Control Cost Manual" Sixth Edition January 2002 EPA/452/B-02-001& William Vatavuk's "Total Annual Cost Spreadsheet Program for Straight Ductwork" [Results scaled up for inflation from 1998 to 2007 USD].

#### **BACT Analysis - Cost Evaluation (cont.)**

Low NOx Burners (50% Control)

Large Process Heater		Mediur	n Process Heater	5
154 MMBtu/hr		24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr
Capital Cost		40000000000000000000000000000000000000		
$BQ = HQ/NB \times (1.158 + 8/HQ)$				1
BQ = 49.0	BQ	12.4	11.2	10.8
TIC = $30,000 + HQ [5,230 - (622 \times BQ) + (26.1 \times BQ^2)]$				
TIC \$8,654,386	TIC	\$84,902	\$78,211	\$76,487
Annual Operating Cost				
AOC = TIC x 2.75%				
AOC= \$238,038	AOC	\$2,335	\$2,151	\$2,104
Cost Effectiveness				neo-properties
CE = ((TIC * CRF) + AOC) / tpy NO <sub>x</sub>				
CE = \$5,521	CE	\$975	\$1,026	\$1,052

**Ultra Low NOx Burners (75% Control)** 

Large Process Heater		Mediun	n Process Heaters	5
154 MMBtu/hr		24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr
Capital Cost				
$BQ = HQ/NB \times (1.158 + 8/HQ)$				
BQ = 49.0	BQ	12.4	11.2	10.8
TIC = $35,000 + HQ [5,230 - (622 \times BQ) + (26.1 \times BQ^2)]$	888888888888888888888888888888888888888			
TIC \$8,659,386	TIC	\$89,902	\$83,211	\$81,487
Annual Operating Cost			,	
AOC = TIC x 2.75%				
AOC= \$238,176	AOC	\$2,473	\$2,289	\$2,241
Cost Effectiveness				
CE = ((TIC * CRF) + AOC) / tpy NO <sub>x</sub>	1 1			
CE = \$3,683	CE	\$688	\$728	\$747

## **BACT Analysis - Cost Evaluation (cont.)**

SCR (80% Control)

Large Process Heater				Mediun	n Process Heaters	
154 MMBt	154 MMBtu/hr			24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr
Capital Co						
		.6) + 49,000 x (HQ/485)				
TIC =	\$2,859,212		TIC	\$933,265	\$861,236	\$836,330
Annual On	erating Cost					
	NH <sub>3</sub> Cost					
	NH <sub>3</sub> Cost = HQ x (I	b NOx/MMBtu) x (1 mole NO <sub>2</sub> /46 lb NO2)				
	x (17 lb NH3/1 mol	e NH <sub>3</sub> ) x (mole NH <sub>3</sub> /mole NOx) x				
	(\$0.125/lb NH <sub>3</sub> ) x (	B,760 hr/yr) x CF				
	NH <sub>3</sub> Cost =	\$82,001	NH <sub>3</sub>	\$12,779	\$11,182	\$10,649
	Catalyst Replaçem	ent Cost				
	CRC = 49,000 x (N					
	CRC =	\$46,483	CRC	\$7,244	\$6,339	\$6,037
	Electricity Cost					
	EC = (0.3 kWh/ton	NH <sub>3</sub> ) x (ton NH <sub>3</sub> ) x (\$0.06/kWh) x CF				
	EC =	\$107,033	EC	\$5,947	\$5,204	\$4,963
	Fuel Penalty Cost					
	•	x 8,760 hr/yr x fuel cost \$/MMBtu x CF				•
	FP =	\$170,847	FP	\$26,625	\$23,297	\$22,188
Total Annual Operating Cost \$406,363		Total	\$52,596	\$46,022	\$43,837	
Cost Effectiveness						
CE = ((TIC * CRF) + AOC) / tpy NO <sub>x</sub>						
CE =	\$1,909		CE	\$7,833	\$8,140	\$8,245

FGR (10% Control)

Large Process Heater	. [	Medium Process Heaters			
154 MMBtu/hr		24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr	
Capital Cost		***************************************			
$TIC = 12,800 \times (HQ)^{0.6}$					
TIC = \$384,327	TIC	\$125,984	\$116,284	\$112,929	
Annual Operating Cost Electricity Cost					
EC = (motor hp) x (0.75 kW/hp) x (8,760 hr/yr) x (\$0.06/kWh) x CF EC = \$25,116	EC	\$4,019	\$4,019	\$4,019	
Cost Effectiveness CE = ((TIC * CRF) + AOC) / tpy NO <sub>x</sub>					
CE = \$1,499	CE	\$7,418	\$7,945	\$8,138	

## **BACT Analysis - Cost Evaluation (cont.)**

LNB + FGR (55% Control)

Large Process Heater		Medium Process Heaters			
154 MMBtu/hr		24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr	
<u>Total TIC</u> \$9,038,713		\$210,886	\$194,496	\$189,417	
Total Annual Operating Cost \$263,154		\$6,354	\$6,170	\$6,122	
Cost Effectiveness CE = ( (Total TIC x CRF) + AOC ) / tons removed					
CE = \$5,291	CE	\$2,235	\$2,377	\$2,436	

ULNB + FGR (80% Control)

Large Process Heater		Medium Process Heaters			
154 MMBtu/hr		24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr	
<u>Total TIC</u> \$9,043,713	Г	\$215,886	\$199,496	\$194,417	
Total Annual Operating Cost \$263,292		\$6,491	\$6,307	\$6,260	
Cost Effectiveness					
CE = ( (Total TIC x CRF) + AOC ) / tons removed					
CE = \$3,640	CE	\$1,572	\$1,675	\$1,718	

LNB + SCR (88% Control)

Large Process Heater	T	Medium Process Heaters			
154 MMBtu/hr		24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr	
<u>Total TIC</u> \$11,513,598		\$1,018,167	\$939,447	\$912,817	
Total Annual Operating Cost \$644,401		\$54,931	\$48,173	\$45,941	
Cost Effectiveness CE = ( (Total TIC x CRF) + AOC ) / tons removed CE = \$4.872		A. T. A			
CE = \$4,872	CE	<b>\$7,67</b> 5	\$7,983	\$8,094	

ULNB + SCR (95% Control)

Large Process Heater		Medium Process Heaters			
154 MMBtu/hr		24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr	
Total TIC \$11,518,598		\$1,023,167	\$944,447	\$917,817	
Total Annual Operating Cost \$644,539	1	\$55,069	\$48,310	\$46,078	
Cost Effectiveness		·			
CE = ( (Total TIC x CRF) + AOC ) / tons removed					
CE = \$4,515	CE	\$7,140	\$7,429	\$7,534	

## **BACT Analysis - Cost Evaluation (cont.)**

## Ducting all Process Heaters to Single SCR Located at Large Process Heater

#### Large & Medium Process Heaters Combined

#### Assumptions/Notes

Exhaust streams from the 3 medium process heaters can be ducted together Design details such as duct velocity and pressure drop are not critical to cost estimates Ductwork Costs have been adjusted for inflation See attached spreadsheet for ductwork cost estimate

## Capital Cost

TIC = 1,373,000 x ((HQ/48.5)^0.6) + 49,000 x (HQ/485)

TIC = Ductwork = \$3,536,177.40 \$73,568.40

Total =

\$3,609,745.79

## Annual Operating Cost

NH3 Cost

NH $_3$  Cost = HQ x (lb NOx/MMBtu) x (1 mote NO $_2$ /46 lb NO $_2$ ) x (17 lb NH $_3$ /1 mote NH $_3$ ) x (mote NH $_3$ /mote NOx) x (\$0.125/lb NH $_3$ ) x (8,760 hr/yr) x CF

NH<sub>3</sub> Cost =

\$116,611.13

#### Catalyst Replacement Cost

CRC = 49,000 x (HQ/48.5) / 5 yr

CRC =

\$66,102.31

## Electricity Cost

 $EC = (0.3 \text{ kWh/ton NH}_3) \times (\text{ton NH}_3) \times (\$0.06/\text{kWh}) \times CF$ 

EC =

\$128,230.42

## Fuel Penalty Cost

FP = (0.015) x HQ x 8,760 hr/yr x fuel cost \$/MMBtu x CF

FP =

\$242,957.23

## Ductwork Annual Cost Inputs

DAC =

\$10,925.51

## Total Annual Operating Cost

\$564,826.61

## Cost Effectiveness

CE = (TiC + AOC) / tpy NOx

CE =

\$2,200.31

TOTAL ANNUAL COST SPREADSHEET PROGRAM	STRAIGHT	DUCTWORK [1]
COST BASE DATE: Second Quarter 1993	[2]	
PPI (Fourth Quarter 1998FINAL): [3	]	100.8
INPUT PARAME	TERS	
Inlet stream flowrate (acfm): Duct velocity (ft/min): [4] Duct length (ft): [5] Material of construction: [6] Insulation thickness (in.): (text: Duct design: [8] Cost equation parameters: [9]  Cost equation form: [10] Control system installation factor (if no system, enter '0')		18503 2000 400 Galv. CS sh. 3 Circspiral a: 2.56 b: 0.937 1
Fan-motor combined efficiency (frac	ction):	0.60
DESIGN PARAM	ETERS	
Duct diameter (in.): Pressure drop (in. w.c.): [12]		41.2 0.442
CAPITAL COST	S	
Equipment Cost (\$)base: ' 'escalated: Purchased Equipment Cost (\$): Total Capital Investment (\$): [13]		33,356 36,827 39,773 59,660
ANNUAL COST	INPUTS	
Operating factor (hours/year): Electricity price (\$/kWhr): Annual interest rate (fractional): Ductwork economic life (years): Capital recovery factor (system): Taxes, insurance, admin. factor:	876 0.06 0.0 2 0.094 0.0	0 7 0 4
ANNUAL Item		r) Wt.Fact.
Electricity Taxes, insurance, administrative Capital recovery	84 2,38 5,63	
Total Annual Cost	8,86	0 1.000

#### Notes:

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- [1] Data used to develop this program were taken from 'OAQPS Control Cost Manual', 5th edition, Chapter 10.

  Prices are for CIRCULAR straight ductwork, only.
- [2] Base ductwork costs reflect this date.
- [3] PPI = Producer Price Index PCU 3444#1 ('Air-conditioning ducts and stove pipe') for year and quarter shown. Ductwork equipment cost has been escalated to this date via this PPI.
- [4] See 'Manual,' pp. 10-30 to 10-33.
- [5] Duct length is a site-specific parameter that can vary from < 10 to > 1000 ft.
- [6] Choices available are: carbon steel sheet (galv. CS sh.) stainless steel sheet (304 SS sh.), coated carbon steel plate (coat. CS pl.), 304 stainless steel plate (304 SS pl.) polyvinyl chloride (PVC), and fiber-reinforced plastic (FRP)
- [7] Choices are: 0, 1, and 3.
- [8] Choices are: circular spiral (circ.-spiral) and circular longitudinal (circ.-long.)
- [9] Equation type and parameters depend on duct material of construction. Parameters reflect 2nd quarter 1993 costs. See 'Manual,' pp. 10-44 to 10-49.
- [10] Choices are: power function (1) and exponential (2).
- [11] Installation factor depends on control device ductwork is supporting. This factor, when multiplied by Purchased Equipment Cost, yields Total Capital Investment (TCI). If ductwork is installed alone, factor is 1.25 to 1.50. (Default = 1.50.) See 'Manual'.
- [12] Pressure drop applies ONLY to circular, spiral-wound galvanized duct with 10 joints per 100 feet. For pressure drop data for other duct types, see 'Manual,' Chapter 10.
- [13] Product of installation factor and Purchased Equipment Cost. Costs are presented both in terms of 2nd quarter '93 and above escalation date. Latter costs are based on Producer Price Index PCU 3444#1 ('Air-conditioning ducts and stove pipe')

EPA-452/F-03-015



# Air Pollution Control Technology Fact Sheet

Name of Technology: Packed-Bed/Packed-Tower Wet Scrubber

This type of technology is a part of the group of air pollution controls collectively referred to as "wet scrubbers." When used to control inorganic gases, they may also be referred to as "acid gas scrubbers."

Type of Technology: Removal of air pollutants by inertial or diffusional impaction, reaction with a sorbent or reagent slurry, or absorption into liquid solvent.

#### **Applicable Pollutants:**

Primarily inorganic fumes, vapors, and gases (e.g., chromic acid, hydrogen sulfide, ammonia, chlorides, fluorides, and  $SO_2$ ); volatile organic compounds (VOC); and particulate matter (PM), including PM less than or equal to 10 micrometers ( $\mu$ m) in aerodynamic diameter ( $PM_{10}$ ), PM less than or equal to 2.5  $\mu$ m in aerodynamic diameter ( $PM_{2.5}$ ), and hazardous air pollutants (HAP) in particulate form ( $PM_{HAP}$ ).

Absorption is widely used as a raw material and/or product recovery technique in separation and purification of gaseous streams containing high concentrations of VOC, especially water-soluble compounds such as methanol, ethanol, isopropanol, butanol, acetone, and formaldehyde (Croll Reynolds, 1999). Hydrophobic VOC can be absorbed using an amphiphilic block copolymer dissolved in water. However, as an emission control technique, it is much more commonly employed for controlling inorganic gases than for VOC. When using absorption as the primary control technique for organic vapors, the spent solvent must be easily regenerated or disposed of in an environmentally acceptable manner (EPA, 1991). When used for PM control, high concentrations can clog the bed, limiting these devices to controlling streams with relatively low dust loadings (EPA, 1998).

## Achievable Emission Limits/Reductions:

Inorganic Gases: Control device vendors estimate that removal efficiencies range from 95 to 99 percent (EPA, 1993).

VOC: Removal efficiencies for gas absorbers vary for each pollutant-solvent system and with the type of absorber used. Most absorbers have removal efficiencies in excess of 90 percent, and packed-tower absorbers may achieve efficiencies greater than 99 percent for some pollutant-solvent systems. The typical collection efficiency range is from 70 to greater than 99 percent (EPA, 1996a; EPA, 1991).

PM: Packed-bed wet scrubbers are limited to applications in which dust loading is low, and collection efficiencies range from 50 to 95 percent, depending upon the application (EPA, 1998).

Applicable Source Type: Point

#### Typical Industrial Applications:

The suitability of gas absorption as a pollution control method is generally dependent on the following factors: 1) availability of suitable solvent; 2) required removal efficiency; 3) pollutant concentration in the inlet vapor;

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Packed-Bed/Packed-Tower Scrubber

4) capacity required for handling waste gas; and, 5) recovery value of the pollutant(s) or the disposal cost of the unrecoverable solvent (EPA, 1996a). Packed-bed scrubbers are typically used in the chemical, aluminum, coke and ferroalloy, food and agriculture, and chromium electroplating industries. These scrubbers have had limited use as part of flue gas desulfurization (FGD) systems, but the scrubbing solution flow rate must be carefully controlled to avoid flooding (EPA, 1998; EPA, 1981).

When absorption is used for VOC control, packed towers are usually more cost effective than impingement plate towers. However, in certain cases, the impingement plate design is preferred over packed-tower columns when either internal cooling is desired, or where low liquid flow rates would inadequately wet the packing (EPA, 1992).

## **Emission Stream Characteristics:**

- a. Air Flow: Typical gas flow rates for packed-bed wet scrubbers are 0.25 to 35 standard cubic meters per second (sm³/sec) (500 to 75,000 standard cubic feet per minute (scfm)) (EPA, 1982; EPA, 1998).
- b. Temperature: Inlet temperatures are usually in the range of 4 to 370°C (40 to 700°F) for waste gases in which the PM is to be controlled, and for gas absorption applications, 4 to 38°C (40 to 100°F). In general, the higher the gas temperature, the lower the absorption rate, and vice-versa. Excessively high gas temperatures also can lead to significant solvent or scrubbing liquid loss through evaporation. (Avallone, 1996; EPA, 1996a).
- c. Pollutant Loading: Typical gaseous pollutant concentrations range from 250 to 10,000 ppmv (EPA, 1996a). Packed-bed wet scrubbers are generally limited to applications in which PM concentrations are less than 0.45 grams per standard cubic meter (g/sm³) (0.20 grains per standard cubic foot (gr/scf)) to avoid clogging (EPA, 1982).
- d. Other Considerations: For organic vapor HAP control applications, low outlet concentrations will typically be required, leading to impractically tall absorption towers, long contact times, and high liquid-gas ratios that may not be cost-effective. Wet scrubbers will generally be effective for HAP control when they are used in combination with other control devices such as incinerators or carbon adsorbers (EPA, 1991).

## **Emission Stream Pretreatment Requirements:**

For absorption applications, precoolers (e.g., spray chambers, quenchers) may be needed to saturate the gas stream or to reduce the inlet air temperature to acceptable levels to avoid solvent evaporation or reduced absorption rates (EPA, 1996a).

## Cost Information:

The following are cost ranges (expressed in 2002 dollars) for packed-bed wet scrubbers of conventional design under typical operating conditions, developed using EPA cost-estimating spreadsheets (EPA, 1996a) and referenced to the volumetric flow rate of the waste stream treated. For purposes of calculating the example cost effectiveness, the pollutant used is hydrochloric acid and the solvent is aqueous caustic soda. The costs do not include costs for post-treatment or disposal of used solvent or waste. Costs can be substantially higher than in the ranges shown for applications which require expensive materials, solvents, or treatment methods. As a rule, smaller units controlling a low concentration waste stream will be much more expensive (per unit volumetric flow rate) than a large unit cleaning a high pollutant load flow.

- a. Capital Cost: \$23,000 to \$117,000 per sm³/sec (\$11 to \$55 per scfm)
- b. O & M Cost: \$32,000 to \$104,000 per sm³/sec (\$15 to \$49 per scfm), annually
- Annualized Cost: \$36,000 to \$165,000 per sm<sup>3</sup>/sec (\$17 to \$78 per scfm), annually
- d. Cost Effectiveness: \$110 to \$550 per metric ton (\$100 to \$500 per short ton), annualized cost per ton per year of pollutant controlled

## Theory of Operation:

Packed-bed scrubbers consist of a chamber containing layers of variously-shaped packing material, such as Raschig rings, spiral rings, or Berl saddles, that provide a large surface area for liquid-particle contact. The packing is held in place by wire mesh retainers and supported by a plate near the bottom of the scrubber. Scrubbing liquid is evenly introduced above the packing and flows down through the bed. The liquid coats the packing and establishes a thin film. The pollutant to be absorbed must be soluble in the fluid. In vertical designs (packed towers), the gas stream flows up the chamber (countercurrent to the liquid). Some packed beds are designed horizontally for gas flow across the packing (crosscurrent) (EPA, 1998).

Physical absorption depends on properties of the gas stream and liquid solvent, such as density and viscosity, as well as specific characteristics of the pollutant(s) in the gas and the liquid stream (e.g., diffusivity, equilibrium solubility). These properties are temperature dependent, and lower temperatures generally favor absorption of gases by the solvent. Absorption is also enhanced by greater contacting surface, higher liquidgas ratios, and higher concentrations in the gas stream (EPA, 1991). Chemical absorption may be limited by the rate of reaction, although the rate-limiting step is typically the physical absorption rate, not the chemical reaction rate (EPA, 1996a; EPA, 1996b).

## Inorganic Gases Control:

Water is the most common solvent used to remove inorganic contaminants. Pollutant removal may be enhanced by manipulating the chemistry of the absorbing solution so that it reacts with the pollutant. Caustic solution (sodium hydroxide, NaOH) is the most common scrubbing liquid used for acid-gas control (e.g., HCl,  $SO_2$ , or both), though sodium carbonate ( $Na_2CO_3$ ) and calcium hydroxide (slaked lime,  $Ca[OH]_2$ ) are also used. When the acid gases are absorbed into the scrubbing solution, they react with alkaline compounds to produce neutral salts. The rate of absorption of the acid gases is dependent upon the solubility of the acid gases in the scrubbing liquid (EPA, 1996a; EPA, 1996b).

#### VOC Control:

Absorption is a commonly applied operation in chemical processing. It is used as a raw material and/or a product recovery technique in separation and purification of gaseous streams containing high concentrations of organics (e.g., in natural gas purification and coke by-product recovery operations). In absorption, the organics in the gas stream are dissolved in a liquid solvent. The contact between the absorbing liquid and the vent gas is accomplished in counter current spray towers, scrubbers, or packed or plate columns (EPA, 1995).

The use of absorption as the primary control technique for organic vapors is subject to several limiting factors. One factor is the availability of a suitable solvent. The VOC must be soluble in the absorbing liquid and even then, for any given absorbent liquid, only VOC that are soluble can be removed. Some common solvents that may be useful for volatile organics include water, mineral oils, or other nonvolatile petroleum oils. Another factor that affects the suitability of absorption for organic emissions control is the availability of vapor/liquid equilibrium data for the specific organic/solvent system in question. Such data are necessary for the design of absorber systems; however, they are not readily available for uncommon organic compounds.

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The solvent chosen to remove the pollutant(s) should have a high solubility for the vapor or gas, low vapor pressure, low viscosity, and should be relatively inexpensive. Water is used to absorb VOC having relatively high water solubilities. Amphiphilic block copolymers added to water can make hydrophobic VOC dissolve in water. Other solvents such as hydrocarbon oils are used for VOC that have low water solubilities, though only in industries where large volumes of these oils are available (e.g., petroleum refineries and petrochemical plants) (EPA, 1996a).

Another consideration in the application of absorption as a control technique is the treatment or disposal of the material removed from the absorber. In most cases, the scrubbing liquid containing the VOC is regenerated in an operation known as stripping, in which the VOC is desorbed from the absorbent liquid, typically at elevated temperatures and/or under vacuum. The VOC is then recovered as a liquid by a condenser (EPA, 1995).

#### PM Control:

In packed-bed scrubbers, the gas stream is forced to follow a circuitous path through the packing material, on which much of the PM impacts. The liquid on the packing material collects the PM and flows down the chamber towards the drain at the bottom of the tower. A mist eliminator (also called a "de-mister") is typically positioned above/after the packing and scrubbing liquid supply. Any scrubbing liquid and wetted PM entrained in the exiting gas stream will be removed by the mist eliminator and returned to drain through the packed bed.

In a packed-bed scrubber, high PM concentrations can clog the bed, hence the limitation of these devices to streams with relatively low dust loadings. Plugging is a serious problem for packed-bed scrubbers because the packing is more difficult to access and clean than other scrubber designs. Mobile-bed scrubbers are available that are packed with low-density plastic spheres that are free to move within the packed bed. These scrubbers are less susceptible to plugging because of the increased movement of the packing material. In general, packed-bed scrubbers are more suitable for gas scrubbing than PM scrubbing because of the high maintenance requirements for control of PM (EPA, 1998).

## Advantages:

Advantages of packed-bed towers include (AWMA, 1992):

- Relatively low pressure drop;
- Fiberglass-reinforced plastic (FRP) construction permits operation in highly corrosive atmospheres;
- 3. Capable of achieving relatively high mass-transfer efficiencies;
- The height and/or type of packing can be changed to improve mass transfer without purchasing new equipment;
- Relatively low capital cost;
- Relatively small space requirements; and
- Ability to collect PM as well as gases.

## Disadvantages:

Disadvantages of packed-bed towers include (AWMA, 1992):

- May create water (or liquid) disposal problem;
- 2. Waste product collected wet;
- 3. PM may cause plugging of the bed or plates;
- When FRP construction is used, it is sensitive to temperature; and

## 5. Relatively high maintenance costs.

## Other Considerations:

For gas absorption, the water or other solvent must be treated to remove the captured pollutant from the solution. The effluent from the column may be recycled into the system and used again. This is usually the case if the solvent is costly (e.g., hydrocarbon oils, caustic solutions, amphiphilic block copolymer). Initially, the recycle stream may go to a treatment system to remove the pollutants or the reaction product. Make-up solvent may then be added before the liquid stream reenters the column (EPA, 1996a).

For PM applications, wet scrubbers generate waste in the form of a slurry. This creates the need for both wastewater treatment and solid waste disposal. Initially, the slurry is treated to separate the solid waste from the water. The treated water can then be reused or discharged. Once the water is removed, the remaining waste will be in the form of a solid or sludge. If the solid waste is inert and nontoxic, it can generally be landfilled. Hazardous wastes will have more stringent procedures for disposal. In some cases, the solid waste may have value and can be sold or recycled (EPA, 1998).

Configuring a control device that optimizes control of more than one pollutant often does not achieve the highest control possible for any of the pollutants controlled alone. For this reason, waste gas flows which contain multiple pollutants (e.g., PM and SO<sub>2</sub>, or PM and inorganic gases) are generally controlled with multiple control devices, occasionally more than one type of wet scrubber (EC/R, 1996).

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EPA-452/F-03-026



# Air Pollution Control Technology Fact Sheet

Name of Technology:

Fabric Filter - Reverse-Air Cleaned Type

- Reverse-Air Cleaned Type with Sonic Horn Enhancement

- Reverse-Jet Cleaned Type (also referred to as Baghouses)

Type of Technology:

Control Device - Capture/Disposal

Applicable Pollutants: Particulate Matter (PM), including particulate matter less than or equal to 10 micrometers ( $\mu$ m) in aerodynamic diameter (PM $_{10}$ ), particulate matter less than or equal to 2.5  $\mu$ m in aerodynamic diameter (PM $_{2.5}$ ), and hazardous air pollutants (HAPs) that are in particulate form, such as most metals (mercury is the notable exception, as a significant portion of emissions are in the form of elemental vapor).

#### Achievable Emission Limits/Reductions:

Typical new equipment design efficiencies are between 99 and 99.9%. Older existing equipment have a range of actual operating efficiencies of 95 to 99.9%. Several factors determine fabric filter collection efficiency. These include gas filtration velocity, particle characteristics, fabric characteristics, and cleaning mechanism. In general, collection efficiency increases with increasing filtration velocity and particle size.

For a given combination of filter design and dust, the effluent particle concentration from a fabric filter is nearly constant, whereas the overall efficiency is more likely to vary with particulate loading. For this reason, fabric filters can be considered to be constant outlet devices rather than constant efficiency devices. Constant effluent concentration is achieved because at any given time, part of the fabric filter is being cleaned. As a result of the cleaning mechanisms used in fabric filters, the collection efficiency is constantly changing. Each cleaning cycle removes at least some of the filter cake and loosens particles which remain on the filter. When filtration resumes, the filtering capability has been reduced because of the lost filter cake and loose particles are pushed through the filter by the flow of gas. As particles are captured, the efficiency increases until the next cleaning cycle. Average collection efficiencies for fabric filters are usually determined from tests that cover a number of cleaning cycles at a constant inlet loading. (EPA, 1998a)

Applicable Source Type: Point

## Typical Industrial Applications:

Fabric filters can perform very effectively in many different applications. Common applications of fabric filter systems with reverse-air cleaning are presented in Table 1, however, fabric filters can be used in most any process where dust is generated and can be collected and ducted to a central location. Other cleaning-types may also be used in these applications. Sonic hom enhancement of mechanical shaker cleaning is generally used for applications with dense particulates such as utility boilers, metal processing, and mineral products.

Table 1. Typical Industrial Applications of Reverse-Air -Cleaned Fabric Filters (EPA, 1997; EPA, 1998a)

Application	Source Category Code (SCC)
Utility Boilers (Coal)	1-01-002003
Industrial Boilers (Coal, Wood)	1-02-001003, 1-02-009
Commercial/Institutional Boilers (Coal, Wood)	1-03-001003, 1-03-009
Non-Ferrous Metals Processing (Primary and Secondary):	
Copper	3-03-005, 3-04-002
Lead	3-03-010, 3-04-004
Zinc	3-03-030, 3-04-008
Aluminum	3-03-000002 3-04-001
Other metals production	3-03-011014 3-04-005006 3-04-010022
Ferrous Metals Processing:	
Coke	3-03-003004
Ferroalloy Production	3-03-006007
Iron and Steel Production	3-03-008009
Gray Iron Foundries	3-04-003
Steel Foundries Mineral Products:	3-04-007,-009
Cement Manufacturing	3-05-006007
Coal Cleaning	3-05-010
Stone Quarrying and Processing	3-05-020
Other	3-05-003999
Asphalt Manufacture	3-05-001002
Grain Milling	3-02-007

## **Emission Stream Characteristics:**

- a. Air Flow: Baghouses are separated into two groups, standard and custom, which are further separated into low, medium, and high capacity. Standard baghouses are factory-built, off the shelf units. They may handle from less than 0.10 to more than 50 standard cubic meters per second (sm³/sec) ("hundreds" to more than 100,000 standard cubic feet per minute (scfm)). Custom baghouses are designed for specific applications and are built to the specifications prescribed by the customer. These units are generally much larger than standard units, i.e., from 50 to over 500 sm³/sec (100,000 to over 1,000,000 scfm). (EPA, 1998b)
- Temperature: Typically, gas temperatures up to about 260°C (500°F), with surges to about 290°C (550°F) can be accommodated routinely, with the appropriate fabric material. Spray coolers or

dilution air can be used to lower the temperature of the pollutant stream. This prevents the temperature limits of the fabric from being exceeded. Lowering the temperature, however, increases the humidity of the pollutant stream. Therefore, the minimum temperature of the pollutant stream must remain above the dew point of any condensable in the stream. The baghouse and associated ductwork should be insulated and possibly heated if condensation may occur. (EPA, 1998b)

- c. Pollutant Loading: Typical inlet concentrations to baghouses are 1 to 23 grams per cubic meter (g/m³) (0.5 to 10 grains per cubic foot (gr/ft³)), but in extreme cases, inlet conditions may vary between 0.1 to more than 230 g/m³ (0.05 to more than 100 gr/ft³). (EPA, 1998b)
- d. Other Considerations: Moisture and corrosives content are the major gas stream characteristics requiring design consideration. Standard fabric filters can be used in pressure or vacuum service, but only within the range of about ± 640 millimeters of water column (25 inches of water column). Well-designed and operated baghouses have been shown to be capable of reducing overall particulate emissions to less than 0.05 g/m³ (0.010 gr/ft³), and in a number of cases, to as low as 0.002 to 0.011 g/dsm³ (0.001 to 0.005 gr/dscf). (AWMA, 1992)

## **Emission Stream Pretreatment Requirements:**

Because of the wide variety of filter types available to the designer, it is not usually required to pretreat a waste stream's inlet temperature. However, in some high temperature applications, the cost of high temperature-resistant bags must be weighed against the cost of cooling the inlet temperature with spray coolers or dilution air (EPA, 1998b). When much of the pollutant loading consists of relatively large particles, mechanical collectors such as cyclones may be used to reduce the load on the fabric filter, especially at high inlet concentrations (EPA, 1998b).

## Cost Information:

Cost estimates are presented below for reverse-air cleaned fabric filters, for sonic horn enhancement, and for reverse-jet cleaned fabric filters. The costs are expressed in 2002 dollars for reverse-air cleaned and sonic horn enhancement. The cost estimates assume a conventional design under typical operating conditions. The costs do not include auxiliary equipment such as fans and ductwork.

The costs for reverse-air cleaned systems are generated using EPA's cost-estimating spreadsheet for fabric filters (EPA, 1998b). The cost estimate for sonic hom enhancement is obtained from the manufacturer quote given in the OAQPS Control Cost Manual (EPA, 1998b). Sonic homs are presented as an incremental cost to the capital cost for a shaker-cleaned system. The operational and maintenance (O&M) cost for shaker-cleaned systems are reduced by 1% to 3% with the sonic hom enhancement. The capital cost for the reverse-jet cleaned fabric baghouse is based on a manufacturer quote (Carrington, 2000). This quote includes only the baghouse purchased equipment cost. O&M costs, annualized costs, and cost effectiveness were not estimated for reverse-jet. In general, reverse-jet has higher capital costs and O&M costs than reverse-air due to its complexity (see Section 10, Theory of Operation).

Costs are primarily driven by the waste stream volumetric flow rate and pollutant loading. In general, a small unit controlling a low pollutant loading will not be as cost effective as a large unit controlling a high pollutant loading. The costs presented are for flow rates of 470 m³/sec (1,000,000 scfm) and 1.0 m³/sec (2,000 scfm), respectively, and a pollutant loading of 9 g/m³ (4.0 gr/ft³). For reverse-jet, the capital cost presented is for a baghouse of 378,000 m³/sec (800,000 scfm).

Pollutants that require an unusually high level of control or that require the fabric filter bags or the unit itself to be constructed of special materials, such as Gore-Tex or stainless steel, will increase the costs of the

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Fabric Filter Reverse Air-Cleaned Type system (EPA, 1998b). The additional costs for controlling more complex waste streams are not reflected in the estimates given below. For these types of systems, the capital cost could increase by as much as 40% and the O&M cost could increase by as much as 5%.

 a. Capital Cost: \$19,000 to \$180,000 per sm³/s (\$9 to \$85 per sofm), reverse-air \$1,000 to \$1,300 per m³/sec (\$ 0.51 to \$0.61 per sofm), additional cost for sonic horns \$2,000 to \$4,200 per m³/sec (\$1 to \$2 per sofm), reverse-jet purchased equipment cost

O & M Cost: \$14,000 to \$58,000 per sm³/s (\$6 to \$27 per scfm), annually

Annualized Cost: \$17,000 to \$106,000 per sm<sup>3</sup>/s (\$8 to \$50 per scfm), annually

d. Cost Effectiveness: \$58 to \$372 per metric ton (\$53 to \$337 per short ton)

## Theory of Operation:

In a fabric filter, flue gas is passed through a tightly woven or felted fabric, causing PM in the flue gas to be collected on the fabric by sieving and other mechanisms. Fabric filters may be in the form of sheets, cartridges, or bags, with a number of the individual fabric filter units housed together in a group. Bags are most common type of fabric filter. The dust cake that forms on the filter from the collected PM can significantly increase collection efficiency. Fabric filters are frequently referred to as baghouses because the fabric is usually configured in cylindrical bags. Bags may be 6 to 9 m (20 to 30 ft) long and 12.7 to 30.5 centimeters (cm) (5 to 12 inches) in diameter. Groups of bags are placed in isolable compartments to allow cleaning of the bags or replacement of some of the bags without shutting down the entire fabric filter. (STAPPA/ALAPCO, 1996)

Operating conditions are important determinants of the choice of fabric. Some fabrics (e.g., polyolefins, nylons, acrylics, polyesters) are useful only at relatively low temperatures of 95 to 150°C (200 to 300°F). For high-temperature flue gas streams, more thermally stable fabrics such as fiberglass, Teflon®, or Nomex® must be used (STAPPA/ALAPCO, 1996).

Practical application of fabric filters requires the use of a large fabric area in order to avoid an unacceptable pressure drop across the fabric. Baghouse size for a particular unit is determined by the choice of air-to-cloth ratio, or the ratio of volumetric air flow to cloth area. The selection of air-to-cloth ratio depends on the particulate loading and characteristics, and the cleaning method used. A high particulate loading will require the use of a larger baghouse in order to avoid forming too heavy a dust cake, which would result in an excessive pressure drop. As an example, a baghouse for a 250 megawatt (MW) utility boiler may have 5,000 separate bags with a total fabric area approaching 46,500 m² (500,000 square feet). (ICAC, 1999)

Determinants of baghouse performance include the fabric chosen, the cleaning frequency and methods, and the particulate characteristics. Fabrics can be chosen which will intercept a greater fraction of particulate, and some fabrics are coated with a membrane with very fine openings for enhanced removal of submicron particulate. Such fabrics tend to be more expensive. Cleaning intensity and frequency are important variables in determining removal efficiency. Because the dust cake can provide a significant fraction of the fine particulate removal capability of a fabric, cleaning which is too frequent or too intense will lower the removal efficiency. On the other hand, if removal is too infrequent or too ineffective, then the baghouse pressure drop will become too high. (ICAC, 1999)

Reverse-air cleaning is a popular fabric filter cleaning method that has been used extensively and improved over the years. It is a gentler but sometimes less effective cleaning mechanism than mechanical shaking.

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Fabric Filter

Most reverse-air fabric filters operate in a manner similar to shaker-cleaned fabric filters. Typically, the bags are open on the bottom, closed on top and the gas flows from the inside to the outside of the bags with dust being captured on the inside. However, some reverse-air designs collect dust on the outside of the bags. In either design, reverse-air cleaning is performed by forcing clean air through the filters in the opposite direction of the dusty gas flow. The change in direction of the gas flow causes the bag to flex and crack the filter cake. In internal cake collection, the bags are allowed to collapse to some extent during reverse-air cleaning. The bags are usually prevented from collapsing entirely by some kind of support, such as rings that are sewn into the bags. The support enables the dust cake to fall off the bags and into the hopper. Cake release is also aided by the reverse flow of the gas. Because felted fabrics retain dust more than woven fabrics and thus, are more difficult to clean, felts are usually not used in reverse-air systems. (EPA, 1998a)

There are several methods of reversing the flow through the filters. As with mechanical shaker-cleaned fabric filters, the most common approach is to have separate compartments within the fabric filter so that each compartment can be isolated and cleaned separately while the other compartments continue to treat the dusty gas. One method of providing the reverse flow air is by the use of a secondary fan or cleaned gas from the other compartments. Reverse-air cleaning alone is used only in cases where the dust releases easily from the fabric. In many instances, reverse-air is used in conjunction with shaking, pulsing or sonic homs. (EPA, 1998a)

Sonic horns are increasingly being used to enhance the collection efficiency of mechanical shaker and reverse-air fabric filters (AWMA, 1992). Sonic horns utilize compressed air to vibrate a metal diaphragm, producing a low frequency sound wave from the horn bell. The number of horns required is determined by fabric area and the number of baghouse compartments. Typically, 1 to 4 horns per compartment operating at 150 to 200 hertz are required. Compressed air to power the horns is supplied at 275 to 620 kiloPascals (kPa) (40 to 90 pounds per square inch gage (psig)). Sonic horns activate for approximately 10 to 30 seconds during each cleaning cycle (Carr, 1984).

Sonic horn cleaning significantly reduces the residual dust load on the bags. This decreases the pressure drop across the filter fabric by 20 to 60%. It also lessens the mechanical stress on the bags, resulting in longer operational life (Carr, 1984). As stated previously, this can decrease the O&M cost by 1 to 3%, annually. Baghouse compartments are easily retrofitted with sonic horns. Sonic assistance is frequently used with fabric filters at coal-burning utilities (EPA, 1998a).

Reverse-jet is a cleaning method developed in the 1950's to provide better removal of residual dusts. In this method, the reverse air is piped to a ring around the bag with a narrow slot in it. The air flows through the slot, creating a high velocity air stream that flexes the bag at that point. The ring is mounted on a carriage, driven by a motor and cable system, that travels up and down the bag. This method provides excellent cleaning of residual dust. Due to its complexity, however, maintenance requirements are high. In addition, air impingement on the bags results in increased wear (Billings, 1970). The application of reverse-jet cleaning has been declining (EPA, 1998a).

## Advantages:

Fabric filters in general provide high collection efficiencies on both coarse and fine (submicron) particulates. They are relatively insensitive to fluctuations in gas stream conditions. Efficiency and pressure drop are relatively unaffected by large changes in inlet dust loadings for continuously cleaned filters. Filter outlet air is very clean and may be recirculated within the plant in many cases (for energy conservation). Collected material is collected dry for subsequent processing or disposal. Corrosion and rusting of components are usually not problems. Operation is relatively simple. Unlike electrostatic precipitators, fabric filter systems do not require the use of high voltage, therefore, maintenance is simplified and flammable dust may be collected with proper care. The use of selected fibrous or granular filter aids (precoating) permits the high-efficiency collection of submicron smokes and gaseous contaminants. Filter collectors are available in a large

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Fabric Filter

number of configurations, resulting in a range of dimensions and inlet and outlet flange locations to suit installation requirements. (AWMA, 1992)

#### Disadvantages:

Temperatures much in excess of 290°C (550°F) require special refractory mineral or metaltic fabrics, which can be expensive. Certain dusts may require fabric treatments to reduce dust seepage, or in other cases, assist in the removal of the collected dust. Concentrations of some dusts in the collector, approximately 50 g/m³ (22 gr/ft³), may represent a fire or explosion hazard if a spark or flame is accidentally admitted. Fabrics can burn if readily oxidizable dust is being collected. Fabric filters have relatively high maintenance requirements (e.g., periodic bag replacement). Fabric life may be shortened at elevated temperatures and in the presence of acid or alkaline particulate or gas constituents. They cannot be operated in moist environments; hygroscopic materials, condensation of moisture, or tarry adhesive components may cause crusty caking or plugging of the fabric or require special additives. Respiratory protection for maintenance personnel may be required when replacing fabric. Medium pressure drop is required, typically in the range of 100 to 250 mm of water column (4 to 10 inches of water column). (AWMA, 1992)

#### Other Considerations:

Fabric filters are useful for collecting particles with resistivities either too low or too high for collection with electrostatic precipitators. Fabric filters therefore may be good candidates for collecting fly ash from low-sulfur coals or fly ash containing high unburned carbon levels, which respectively have high and low resistivities, and thus are relatively difficult to collect with electrostatic precipitators. (STAPPA/ALAPCO, 1996)

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# Air Pollution Control Technology Fact Sheet

Name of Technology: Catalytic Incinerator

This type of incinerator is also referred to as a catalytic oxidizer, or catalytic reactor.

Type of Technology: Destruction by oxidation.

#### Applicable Pollutants:

Volatile organic compounds (VOC) and many types of particulate matter (PM). In the past, catalytic incinerators were not recommended as a control device for PM, since the PM, unless removed prior to incineration, often coated (or "blinded") the catalyst so that the catalyst's active sites were prevented from aiding in the oxidation of pollutants in the gas stream (EPA, 1998). Examples are gases containing chlorine, sulfur, and other atoms, such as phosphorous, bismuth, lead, arsenic, antimony, mercury, iron oxide, tin, and zinc that may deactivate the supported noble metal catalysts (EPA, 1991).

However, catalysts have been recently developed that can tolerate almost any compound. Most of these catalysts are single or mixed metal oxides, often supported by a mechanically strong carrier such as various types of alumina. Catalysts such as chromia/alumina, cobalt oxide, and copper oxide/manganese oxide have been used for oxidation of gases containing chlorinated compounds. Platinum-based catalysts are active for oxidation of sulfur containing VOC, although they are rapidly deactivated by the presence of chlorine (EPA, 1996a).

#### Achievable Emission Limits/Reductions:

VOC destruction efficiency is dependent upon VOC composition and concentration, operating temperature, oxygen concentration, catalyst characteristics, and space velocity. Space velocity is commonly defined as the volumetric flow of gas entering the catalyst bed chamber divided by the volume of the catalyst bed. The relationship between space velocity and VOC destruction efficiency is strongly influenced by catalyst operating temperature. As space velocity increases, VOC destruction efficiency decreases, and as temperature increases, VOC destruction efficiency increases. As an example, a catalytic unit operating at about 450°C (840°F) with a catalyst bed volume of 0.014 to 0.057 cubic meter (m³) (0.5 to 2 cubic feet (ff³)) per 0.47 standard cubic meters per second (sm³/sec) (1,000 standard cubic feet per minute (scfm)) of offgas passing through the device can achieve 95 percent VOC destruction efficiency (EPA, 1992). Higher destruction efficiencies of (98 - 99 percent) are achievable, but require larger catalyst volumes and/or higher temperatures, and are usually designed on a site-specific basis (EPA, 1991).

In EPA's 1990 National Inventory, incinerators as a group, including catalytic incinerators; were reported as being used as control devices for PM and were reported as achieving 25 - 99% control efficiency of PM<sub>10</sub> at point source facilities (EPA, 1998). Table 1 presents a breakdown of the PM<sub>10</sub> control efficiency ranges by industry where catalytic incinerators have been reported (EPA, 1996b). The VOC control efficiency reported for these devices ranged from 0 to 99.9%, however, it is assumed that reports of higher efficiencies (greater than 99%) are attributable to thermal incinerators. These ranges of control efficiencies are large because they include facilities that do not have VOC emissions and control only PM, as well as facilities which have low PM emissions and are primarily concerned with controlling VOC (EPA, 1998).

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Catalytic Incinerator

Table 1.  $PM_{10}$  Destruction Efficiencies for Catalytic Incinerators and Catalytic Incinerators with Heat Exchanger by Industry (EPA, 1996b)

Industry/Types of Sources	PM <sub>10</sub> Control Efficiency (%)
Petroleum and Coal Products asphalt roofing processes (blowing, felt saturation); mineral calcining; petroleum refinery processes (asphalt blowing, catalytic cracking, coke calcining, sludge converter); sulfur manufacturing	25 - 99.9
Chemical and Allied Products carbon black manufacturing (mfg); charcoal mfg; liquid waste disposal; miscellaneous chemical mfg processes; pesticide mfg; phthalic anhydride mfg (xylene oxidation); plastics/synthetic organic fiber mfg; solid waste incineration (industrial)	50 - 99.9
Primary Metals Industries by-product coke processes (coal unloading, oven charging and pushing, quenching); gray iron cupola and other miscellaneous processes; secondary aluminum processes (burning/drying, smelting furnace); secondary copper processes (scrap drying, scrap cupola, and miscellaneous processes); steel foundry miscellaneous processes; surface coaling oven	70 - 99.9
Electronic and Other Electric Equipment chemical mfg miscellaneous processes; electrical equipment bake furnace; fixed roof tank; mineral production miscellaneous processes; secondary aluminum roll/draw extruding; solid waste incineration (industrial)	70 - 99.9
Electric, Gas, and Sanitary Services internal combustion engines; solid waste incineration (industrial, commercial/ institutional)	90 - 98
Stone, Clay, and Glass Products barium processing kiln; coal cleaning thermal dryer; fabricated plastics machinery; wool fiberglass mfg	50 - 95
Mining asphalt concrete rotary dryer; organic chemical air oxidation units, sulfur production	70 - 99.6
Educational Services solid waste incineration (commercial/ institutional)	80
Paper and Allied Products boiler	95
Printing and Publishing surface coating dryer; fugitives	95

## Applicable Source Type: Point

## **Typical Industrial Applications:**

Catalytic incinerators can be used to reduce emissions from a variety of stationary sources. Solvent evaporation processes associated with surface coating and printing operations are a major source of VOC emissions, and catalytic incineration is widely used by many industries in this category. Catalytic incinerators are also used to control emissions from the following (EPA, 1992):

- Vamish cookers;
- Foundry core ovens;
- Filter paper processing ovens;
- · Plywood veneer dryers:
- Gasoline bulk loading stations;
- Process vents in the synthetic organic chemical manufacturing industry (SOCMI);
- Rubber products and polymer manufacturing; and
- Polyethylene, polystyrene, and polyester resin manufacturing.

Catalytic oxidation is most suited to systems with lower exhaust volumes, when there is little variation in the type and concentration of VOC, and where catalyst poisons or other fouling contaminants such as silicone, sulfur, heavy hydrocarbons and particulates are not present.

## **Emission Stream Characteristics:**

- Air Flow: Typical gas flow rates for packaged catalytic incinerators are 0.33 to 24 sm<sup>3</sup>/sec (700 to 50,000 scfm) (EPA, 1996a).
- b. Temperature: Catalysts in catalytic incinerators cause the oxidizing reaction to occur at a lower temperature than is required for thermal ignition. Waste gas is heated by auxiliary burners to approximately 320°C to 430°C (600°F to 800°F) before entering the catalyst bed (AWMA, 1992). The maximum design exhaust temperature of the catalyst is typically 540° 675°C (1000° 1250°F).
- c. Pollutant Loading: Catalytic incinerators can and have been used effectively at very low inlet loadings; down to 1 part per million by volume (ppmv) or less (EPA, 1995). As with thermal and recuperative incinerators, for safety considerations, the maximum concentration of the organics in the waste gas must be substantially below the lower flammable level (lower explosive limit, or LEL) of the specific compound being controlled. As a rule, a safety factor of four (i.e., 25% of the LEL) is used (EPA, 1991, AWMA, 1992). The waste gas may be diluted with ambient air, if necessary, to lower the concentration.
- d. Other Considerations: Characteristics of the inlet stream should be evaluated in detail, because of the sensitivity of catalytic incinerators to VOC inlet stream flow conditions, which may cause catalyst deactivation (EPA, 1992).

## **Emission Stream Pretreatment Requirements:**

Typically, if design conditions are satisfied no pretreatment is required, however, in some cases, PM removal may be necessary before the waste gas enters the incinerator.

#### Cost Information:

The following are cost ranges (expressed in 2002 dollars) for packaged catalytic incinerators of conventional design with fixed beds under typical operating conditions, developed using EPA cost-estimating spreadsheets (EPA, 1996a) and referenced to the volumetric flow rate of the waste stream treated. The costs do not include costs for a post-oxidation acid gas treatment system. Costs can be substantially higher than the ranges shown when used for low-VOC concentration streams (less than around 100 ppmv). As a rule, smaller units controlling a low concentration waste stream will be much more expensive (per unit volumetric flow rate) than a large unit cleaning a high pollutant load flow. Operation and Maintenance (O & M) Costs, Annualized Cost, and Cost Effectiveness are dominated by the cost of supplemental fuel required.

- a. Capital Cost: \$47,000 to \$191,000 per sm<sup>3</sup>/sec (\$22 to \$90 per scfm)
- b. O & M Cost: \$8,500 to \$53,000 per sm³/sec (\$4 to \$25 per scfm), annually
- Annualized Cost: \$17,000 to \$106,000 per sm<sup>3</sup>/sec (\$8 to \$50 per scfm), annually
- d. Cost Effectiveness: \$105 to \$5,500 per metric ton (\$100 to \$5,000 per short ton), annualized cost per ton per year of pollutant controlled. However, when used to treat very low concentrations of toxic air pollutants (less than 100 ppmv), the cost per ton removed may be many thousands of dollars, because only a small amount of pollutant is being destroyed.

## Theory of Operation:

Catalytic incinerators operate very similar to thermal/recuperative incinerators, with the primary difference that the gas, after passing through the flame area, passes through a catalyst bed. The catalyst has the effect of increasing the exidation reaction rate, enabling conversion at lower reaction temperatures than in thermal incinerator units. Catalysts, therefore, also allow for smaller incinerator size. Catalysts typically used for VOC incineration include platinum and palladium. Other formulations include metal exides, which are used for gas streams containing chlorinated compounds (EPA, 1998).

In a catalytic incinerator, the gas stream is introduced into a mixing chamber where it is also heated. The waste gas usually passes through a recuperative heat exchanger where it is preheated by post combustion gas. The heated gas then passes through the catalyst bed. Oxygen and VOC migrate to the catalyst surface by gas diffusion and are adsorbed onto the catalyst active sites on the surface of the catalyst where oxidation then occurs. The oxidation reaction products are then desorbed from the active sites by the gas and transferred by diffusion back into the gas stream (EPA, 1998).

Particulate matter can rapidly coat the catalyst so that the catalyst active sites are prevented from aiding in the oxidation of pollutants in the gas stream. This effect of PM on the catalyst is called blinding, and will deactivate the catalyst over time. Because essentially all the active surface of the catalyst is contained in relatively small pores, the PM need not be large to blind the catalyst. No general guidelines exist as to the PM concentration and size that can be tolerated by catalysts, because the pore size and volume of catalysts vary widely. This information is likely to be available from the catalyst manufacturers (EPA, 1996a).

The method of contacting the VOC-containing stream with the catalyst serves to distinguish catalystic incineration systems. Both fixed-bed and fluid-bed systems are used.

Fixed-bed catalytic incinerators may use a monolith catalyst or a packed-bed catalyst (EPA, 1996a):

Monolith Catalyst Incinerators - The most widespread method of contacting the VOC-containing stream with the catalyst is the catalyst monolith. In this scheme the catalyst is a porous solid block containing parallel, non-intersecting channels aligned in the direction of the gas flow. Monoliths offer the advantages

of minimal attrition due to thermal expansion/contraction during startup/shutdown and low overall pressure drop.

Packed-Bed Catalytic Incinerators - A second contacting scheme is a simple packed-bed in which catalyst particles are supported either in a tube or in shallow trays through which the gases pass. This scheme is not in widespread use due to its inherently high pressure drop, compared to a monolith, and the breaking of catalyst particles due to thermal expansion when the confined catalyst bed is heated/cooled during startup/shutdown. However, the tray type arrangement of a packed-bed scheme, where the catalyst is pelletized, is used by several industries (e.g., heat-set web-offset printing). Pelletized catalyst is advantageous where large amounts of such contaminants as phosphorous or silicon compounds are present.

Fluid-bed catalytic incinerators have the advantage of very high mass transfer rates, although the overall pressure drop is somewhat higher than for a monolith. An additional advantage of fluid-beds is a high bed-side heat transfer as compared to a normal gas heat transfer coefficient. This higher heat transfer rate to heat transfer tubes immersed in the bed allows higher heat release rates per unit volume of gas processed and, therefore, may allow waste gas with higher heating values to be processed without exceeding maximum permissible temperatures in the catalyst bed. In these reactors the gas phase temperature rise from gas inlet to gas outlet is low, depending on the extent of heat transfer through imbedded heat transfer surfaces. The catalyst temperatures depend on the rate of reaction occurring at the catalyst surface and the rate of heat exchange between the catalyst and imbedded heat transfer surfaces.

As a general rule, fluid-bed systems are more tolerant of PM in the gas stream than either fixed-bed or monolithic catalysts. This is due to the constant abrasion of the fluidized catalyst pellets, which helps remove PM from the exterior of the catalysts in a continuous manner. A disadvantage of a fluid-bed is the gradual loss of catalyst by attrition. However, attrition-resistant catalysts have been developed to overcome this disadvantage.

## Advantages:

Advantages of catalytic incinerators over other types of incinerators include (AWMA, 1992; Cooper and Alley, 1994):

- a. Lower fuel requirements;
- b. Lower operating temperatures;
- c. Little or no insulation requirements:
- d. Reduced fire hazards;
- e. Reduced flashback problems; and
- f. Less volume/size required.

#### Disadvantages:

Disadvantages of catalytic incinerators include (AWMA, 1992):

- a. High initial cost;
- b. Catalyst poisoning is possible;
- c. Particulate often must first be removed; and
- Spent catalyst that cannot be regenerated may need to be disposed.

## Other Considerations:

Catalytic incinerators offer many advantages for the appropriate application. However, selection of a catalytic incinerator should be considered carefully, as the sensitivity of catalytic incinerators to VOC inlet

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Catalytic Incinerator

stream flow conditions and catalyst deactivation limit their applicability for many industrial processes (EPA, 1992).

#### References:

AWMA, 1992. Air & Waste Management Association, <u>Air Pollution Engineering Manual</u>. Van Nostrand Reinhold, New York.

Cooper & Alley, 1994. C. D. Cooper and F. C. Alley, <u>Air Pollution Control: A Design Approach</u>, Second Edition, Waveland Press, Inc. IL.

EPA, 1991. U.S. EPA, Office of Research and Development, "Control Technologies for Hazardous Air Pollutants," EPA/625/6-91/014, Washington, D.C., June.

EPA, 1992. U.S. EPA, Office of Air Quality Planning and Standards, "Control Techniques for Volatile Organic Emissions from Stationary Sources," EPA-453/R-92-018, Research Triangle Park, NC., December.

EPA, 1995. U.S. EPA, Office of Air Quality Planning and Standards, "Survey of Control Technologies for Low Concentration Organic Vapor Gas Streams," EPA-456/R-95-003, Research Triangle Park, NC., May.

EPA, 1996a. U.S. EPA, Office of Air Quality Planning and Standards, "OAQPS Control Cost Manual," Fifth Edition, EPA 453/B-96-001, Research Triangle Park, NC. February.

EPA, 1996b. U.S. EPA, "1990 National Inventory," Research Triangle Park, NC, January.

EPA, 1998. U.S. EPA, Office of Air Quality Planning and Standards, "Stationary Source Control Techniques Document for Fine Particulate Matter," EPA-452/R-97-001, Research Triangle Park, NC., October.

# ATTACHMENT 6D MODULE 6 OEPA APPLICATION FORMS

## Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

- 1. Company identification (name for air contaminant source for which you are applying): FISCHER-TROPSCH SYSTEM
- List all equipment that are part of this air contaminant source: FISCHER-TROPSCH REACTORS (3) WITH TAILGAS SENT TO SPONGE OIL COLUMN WITH F-T FRACTIONATOR FIRED HEATER (154 MMBtu/hr) CONTROLLED BY COMMON SCR UNIT
- Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 OR after issuance of PTI

- 4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.
  - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
  - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
  - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit
    emissions in line # 8 or have described inherent limitations below.
  - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
  - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	4.7	4.7	20.7	4.7	20.7
PM <sub>10</sub> (PM < 10 microns in diameter)	4.7	4.7	20.7	4.7	20.7
Sulfur dioxide (SO <sub>2</sub> )	0.4	0.4	1.6	0.4	1.6
Nitrogen oxides (NO <sub>x</sub> )	140	16.8	73.6	16.8	73.6
Carbon monoxide (CO)	51.9	51.9	227.3	51.9	227.3
Organic compounds (OC)	3.4	3.4	14.9	3.4	14.9
Volatile organic compounds (VOC)	3.4	3.4	14.9	3.4	14.9
Total HAPs	1.2	1.2	5.1	1.2	5.1
Highest single HAP: (hexane)	1.1	1.1	4.9	1.1	4.9
Air Toxics (see instructions):					

## Section II - Specific Air Contaminant Source Information

5.

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

	Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO <sub>2</sub> Nitrogen oxides = NOx; Carbon monoxide = CO
]	Cyclone/Multiclone  Manufacturer: Year installed:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
) F	Fabric Filter/Baghouse  Manufacturer: Year installed:
	What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other  Estimated capture efficiency (%): Basis for efficiency:
	Design control efficiency (%): Basis for efficiency: Operating pressure drop range (inches of water): Minimum: Maximum: Pressure type: ☐ Negative pressure ☐ Positive pressure Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other Lime injection or fabric coating agent used: Type: Feed rate:
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
] '	Wet Scrubber  Manufacturer: Year installed:
	What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:  Type:  Spray chamber  Packed bed  Impingement  Venturi  Operating pressure drop range (inches of water): Minimum:  Maximum:
	pH range for scrubbing liquid: Minimum: Maximum:  Scrubbing liquid flow rate (gal/min): Is scrubber liquid recirculated?
	Water supply pressure (psig):NOTE: This item for spray chambers only.  ☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:

ection II	- Specific Air Contaminant Source Information
	Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Type: Plate-wire Flat-plate Tubular Wet Other
	Number of operating fields:  This is the only control equipment on this air contaminant source If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:
	Concentrator
	Manufacturer: Year installed: What do you call this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other Estimated capture efficiency (%): Basis for efficiency:
	Design regeneration cycle time (minutes):  Minimum desorption air stream temperature (°F):  Rotational rate (revolutions/hour):
	<ul> <li>☐ This is the only control equipment on this air contaminant source</li> <li>If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel</li> <li>List any other air contaminant sources that are also vented to this control equipment:</li> </ul>
	Catalytic Incinerator  Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled:  PE   OC  SO <sub>2</sub> NOx CO Other Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Minimum inlet gas temperature (°F): Combustion chamber residence time (seconds): Minimum temperature difference (°F) across catalyst during air contaminant source operation: This is the only control equipment on this air contaminant source If no, this control equipment is:  Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:
	Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed:
	What do you call this control equipment:  Pollutant(s) controlled:  PE OC SO <sub>2</sub> NOx CO Other  Estimated capture efficiency (%):  Design control efficiency (%):  Basis for efficiency:
	Design control efficiency (%): Basis for efficiency: (See line by line instructions Minimum operating temperature (°F) and location: (See line by line instructions Combustion chamber residence time (seconds): This is the only control equipment on this air contaminant source If no, this control equipment is: □ Primary □ Secondary □ Parallel List any other air contaminant sources that are also vented to this control equipment:
	Elaro
	Flare  Manufacturer:  What do you call this control equipment:  Pollutor (x) post of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula of the formula
	Estimated capture efficiency (%):  Design control efficiency (%):  Basis for efficiency:  Basis for efficiency:
	Type: ☐ Enclosed ☐ Elevated (open)  Ignition device: ☐ Electric arc ☐ Pilot flame  Flame presence sensor: ☐ Yes ☐ No

Section II	- Specific Air Contaminant Source Information
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	Condenser
	Manufacturer: Year installed:
	What do you call this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%):  Basis for efficiency:
	Design control efficiency (%): Basis for efficiency:
	Type: ☐ Indirect contact ☐ Direct contact
	Maximum exhaust gas temperature (°F) during air contaminant source operation:
	Coolant type:
	Design coolant temperature (°F): Minimum Maximum
	Design coolant flow rate (gpm): This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	Carbon Absorber
	Manufacturer: Year installed:
	What do you call this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%): Basis for efficiency: Basis for efficiency:
	Design control efficiency (%): Basis for efficiency:  Type:   On-site regenerative   Disposable
	Maximum design outlet organic compound concentration (ppmv):
	Carbon replacement frequency or regeneration cycle time (specify units):
	Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
П	Dry Scrubber
닙	
	Manufacturer: Year installed: What do you call this control equipment:
	Pollutant(s) controlled:   PE   OC   SO <sub>2</sub> NOx   CO   Other
	Estimated capture efficiency (%): Basis for efficiency:
	Design control efficiency (%): Basis for efficiency:
	Reagent(s) used: Type: Injection rate(s): Operating pressure drop range (inches of water): Minimum: Maximum:
	Operating pressure drop range (inches of water): Minimum: Maximum:
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
	Paint booth filter
لسا	
	Design control efficiency (%): Basis for efficiency:
×	Other, describe ULTRA LOW NOx BURNERS + SELECTIVE CATALYTIC REDUCTION
	Manufacturer: NOT YET SELECTED Year installed: 208
	What do you call this control equipment: ULTRA LOW NOX BURNERS + SELECTIVE CATALYTIC REDUCTION
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☒ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%): 100 Basis for efficiency: ENGINEERING DESIGN Design control efficiency (%): >88 Basis for efficiency: EPA
	= Dadio for emoleticy, EFA

Section	11 -	Specific	<u>Air</u>	Contaminant	Source	Information
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☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☒ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

- 6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.
- 7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

	200000000000000000000000000000000000000	Table 7-A, Stack Egress Po	int Information		in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	
Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
FISCHER-TROPSCH SYSTEM	Α	ROUND 3.28 FT	75	700	36,000	700

<sup>\*</sup>Type codes for stack egress points:

- A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
- B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
- C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

# Section II - Specific Air Contaminant Source Information

		Table 7-B, Fugitive Egress Point Information			
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

<sup>\*</sup>Type codes for fugitive egress point:

D. door or window

E. other opening in the building without a duct

F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional	Information (Add rows as	s necessary)	
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
FISCHER-TROPSCH SYSTEM	328 (Gasifier)	120 (Gasifier)	1,400 (6 Gasifiers)

## 8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific
requirements listed below (i.e. are your second by proposition of the listed below (i.e. are your second specific
requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes

⊠ no

□ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a.	to avoid being a major source (see OAC rule 3745-77-01

b. to avoid being a major MACT source (see OAC rule 3745-31-01)

to avoid being a major modification (see OAC rule 3745-31-01)

c. □ to avoid being a major modification (see OAC rule 3745-31-01)
d. □ to avoid being a major stationary source (see OAC rule 3745-31-01)

e. 

to avoid an air dispersion modeling requirement (see Engineering Guide # 69)

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

## Section II - Specific Air Contaminant Source Information

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
FISCHER- TROPSCH SYSTEM	NONE (ANALYTICAL TESTING OF FUEL GAS)	NONE (162 ppmv [3-hr avg.], 60 ppmv [daily avg], H₂S IN FUEL GAS	H₂S IN FUEL GAS

10.	Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?
	<ul> <li>□ yes - Note: notification requirements in rules cited above must be followed.</li> <li>□ no</li> </ul>

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI #:

# EMISSIONS ACTIVITY CATEGORY FORM FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

New Permit Renewa	al or Modification of Air Permit Nun	nber(s) (e.a. 8001)
	24 hours per day; 365 days per	, , , , , , , , , , , , , , , , , , , ,
	·	
maximum? See instructions for	ours/day or 365 days/year, what line examples.	
Input Capacity (million Btu/hr):		
Rated (Indicate units if other than mmBtu/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBtu/hr
154.0	154.0	154.0
(lb steam/hr)	(lb steam/hr)	(lb steam/hr)
Not applicable - operation de	oes not produce steam.	
Percent of Operating Time Used	l for:	
Process: 100 %		
Space Heat:%		
Type of Draft (check one):		
☐ Natural ☐ Induced ☒ F	orced	
Type of combustion monitoring (	check one):	
☐ Fuel/Air Ratio ☐ Oxygen		

o. Type o	Truel Fired (d	complete all t	hat apply	);			
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup			·	tons	lbs	lbs
No. 2 Fuel Oil	Primary Backup				gal	gal	gal
No. 6 Fuel Oil	Primary Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☐ Backup	950	ar part w	0.05	1,400 MMSCF	162,000 SCF	222,000 SCF
Wood	Primary Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	⊠ Primary □ Backup	487.5	NIL	0.001	2,800 MMSCF	316,000 SCF	433,000 SCF
Other**	☐ Primary ☐ Backup						
* Please id	entify all comb	oinations of f	uels that a	are co-fire	ed:		
	ther fuel(s): T						
9. Type of	f Coal Firing (d	shock one).	Coal	l-Fired U	nits		
a. Type of	r Coarraing (c	neck one).					
	erized-Wet Bo				hain Grate	Traveling Gra	
∐ Pul\ □ Und	verized-Dry Bo lerfeed Stoker	ttom [_] Cyc		S describe	preader Stoker	Fluidized Bed	d
	Reinjection:			(400001100	.,		
☐ Yes	ß □ No	•					
11. Overfire	e Air:						
☐ Yes	S □ No						
			Oil-	Fired Un	its		
12. Oil Preh	neater:						
☐ Yes ☐ No	- Indicate Ter	mperature	deg	ı. F			

## Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

- Company identification (name for air contaminant source for which you are applying): PRODUCT UPGRADE SYSTEM
- List all equipment that are part of this air contaminant source: HYDROCRACKER/PRODUCT FRACTIONATOR WITH PRODUCTION FRACTIONATION FEED HEATER (24 MMBtu/hr), HYDROCRACKER FEED OIL HEATER (21 MMBtu/hr), HYDROCRACKER FEED HYDROGEN HEATER (20 MMBtu/hr), CONTROLLED BY COMMON SCR DEVICE
- 3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 OR after issuance of PTI

- 4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.
  - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
  - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
  - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
  - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
  - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	4.7	4.7	20.7	4.7	20.7
PM <sub>10</sub> (PM < 10 microns in diameter)	4.7	4.7	20.7	4.7	20.7
Sulfur dioxide (SO₂)	0.4	0.4	1.6	0.4	1.6
Nitrogen oxides (NO <sub>x</sub> )	140	16.8	73.6	16.8	73.6
Carbon monoxide (CO)	51.9	51.9	227.3	51.9	227.3
Organic compounds (OC)	3.4	3.4	14.9	3.4	14.9
Volatile organic compounds (VOC)	3.4	3.4	14.9	3.4	14.9
Total HAPs	1.2	1.2	5.1	1.2	5.1
Highest single HAP: (hexane)	1.1	1.1	4.9	1.1	4.9
Air Toxics (see instructions):					

Section II - Sp	<u>ecific Air Conta</u>	minant Source	Information

5.

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

	No - proceed to item # 6.
	Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO Nitrogen oxides = NOx; Carbon monoxide = CO
	Cyclone/Multiclone
	Manufacturer: Year installed:
	What do you call this control equipment:  Pollutant(s) controlled:   PE   OC   SO <sub>2</sub> NOx   Other  Estimated capture efficiency (%):  Pasis for efficiency:
	Pollutant(s) controlled: LI PE
	Dadio for entirety.
	Design control efficiency (%):  Basis for efficiency:  Type: G. Cyclone, G. Multisland, G. Batarland, G. Cyclone, G. Multisland, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclone, G. Cyclon
	Type. If Cyclone I Multicione II Rotocione II Other
	En This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
7	Eghrig Eilter/Deghaus
	Fabric Filter/Baghouse
	Manufacturer: Year installed:
	Pollutant/s) controlled: D. D. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C. D. C.
	Estimated capture efficiency (9/):
	Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:  Operating pressure drop range (inches of water): Minimum:Maximum:
	Operating pressure drop range (inches of water): Minimum.
	Pressure type:  Negative pressure Positive pressure
	Fabric cleaning mechanism: Cl. Reverse air Cl. Pulse let Cl. Shaker Cl. Other
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse iet ☐ Shaker ☐ Other
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ☐ Lime injection or fabric coating agent used: Type; Feed rate:
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ☐ Lime injection or fabric coating agent used: Type; Feed rate:
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
]	Fabric cleaning mechanism:  Reverse air Pulse jet Shaker Other Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber
]	Fabric cleaning mechanism:  Reverse air Pulse jet Shaker Other Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber Manufacturer: Year installed:
]	Fabric cleaning mechanism:  Reverse air Pulse jet Shaker Other Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber Manufacturer: Year installed: What do you call this control equipment:
]	Fabric cleaning mechanism:  Reverse air Pulse jet Shaker Other Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: PE DOC DOC DOC DOC DOC DOC DOC DOC DOC DOC
	Fabric cleaning mechanism:  Reverse air Pulse jet Shaker Other Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: PE DOC DSO: DNOY DCO DOT Other
]	Fabric cleaning mechanism:  Reverse air Pulse jet Shaker Other Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: PE OC SO2 NOX CO Other Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency:
]	Fabric cleaning mechanism:
]	Fabric cleaning mechanism:    Reverse air    Pulse jet    Shaker    Other
]	Fabric cleaning mechanism:
]	Fabric cleaning mechanism:
]	Fabric cleaning mechanism:
3	Fabric cleaning mechanism:
]	Fabric cleaning mechanism:
3	Fabric cleaning mechanism:
]	Fabric cleaning mechanism:
	Fabric cleaning mechanism:
	Fabric cleaning mechanism:

ection II	- Specific Air Contaminant Source Information
	Estimated capture efficiency (%): Basis for efficiency:
	Design control efficiency (%):  Basis for efficiency:
	Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other
	Number of operating fields:
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
	Concentrator
	Manufacturer: Year installed:
	Manufacturer: Year installed: What do you call this control equipment:
	Pollutant(s) controlled:   PE DOC DSO2 DNOX DCO Dther
	Estimated capture efficiency (%): Basis for efficiency:
	Design regeneration cycle time (minutes):
	Minimum desorption air stream temperature (°F):
	Rotational rate (revolutional haus)
	Rotational rate (revolutions/hour):  This is the only control equipment on this air contaminant source
	This is the only control equipment on this air contaminant source
	ii no, this control equipment is:
	List any other air contaminant sources that are also vented to this control equipment:
	Catalytic Incinerator
	Manufacturer: Year installed:
	What do you call this control equipment:
	Pollutant(s) controlled: FLDE FLOO FLOO FLOO
	Estimated capture efficiency (%): Basis for efficiency:
	Design control officiones (9/). Basis for efficiency:
	Design control efficiency (%): Basis for efficiency:
	Minimum inlet gas temperature (°F):
	Combustion chamber residence time (seconds):
	Minimum temperature difference (°F) across catalyst during air contaminant source operation:
	Li This is the only control equipment on this air contaminant source
	if no, this control equipment is: □ Primary □ Secondary □ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	Thermal Incinerator/Thermal Oxidizer
	Manufacturer: Year installed:
	writer do you can this control equipment.
	Pollutant(s) controlled: PF DOC DSO DNOV DCC DOV
	Estimated capture efficiency (%):
	Estimated capture efficiency (%):  Design control efficiency (%):  Basis for efficiency:  Basis for efficiency:
	Minimum operating temperature (°F) and location:
	Design control efficiency (%):  Minimum operating temperature (°F) and location:  Combustion chamber residence time (seconds):  Basis for efficiency:  (See line by line instructions.
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	Flare
	Manufacturer: Year installed:
	what do you call this control equipment:
	Pollutant(s) controlled: IT PE IT OC IT SO IT NOV IT CO IT Other
	Estimated capture efficiency (%): Basis for efficiency: Basis for efficiency:
	Design control efficiency (%): Basis for efficiency: Type: □ Enclosed □ Elevated (open)
	Ignition device: ☐ Electric arc ☐ Pilot flame
	Flame precence concert CL Voe CL No.
	Flame presence sensor: ☐ Yes ☐ No

	☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:
	Condenser  Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: □ PE □ OC □ SO₂ □ NOx □ CO □ Other
	Estimated capture efficiency (%): Basis for efficiency: Basis for efficiency:
	Type: ☐ Indirect contact ☐ Direct contact  Maximum exhaust gas temperature (°F) during air contaminant source operation:  Coolant type:
	Coolant type: Maximum Maximum Maximum  Design coolant flow rate (gpm): Maximum  This is the only control equipment on this air contaminant source
	If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:
	Carbon Absorber  Manufacturer:  Voor installed:
	Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:
	Type:  On-site regenerative  Disposable  Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):
	<ul> <li>☐ This is the only control equipment on this air contaminant source</li> <li>If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel</li> <li>List any other air contaminant sources that are also vented to this control equipment:</li> </ul>
	Dry Scrubber  Manufacturer: Year installed:
	What do you call this control equipment: NOx □ CO □ Other
	Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:  Reagent(s) used: Type: Injection rate(s):  Operating pressure drop range (inches of water): Minimum: Maximum:
	Operating pressure drop range (inches of water): Minimum: Maximum:  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:
	Paint booth filter  Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other  Design control efficiency (%): Basis for efficiency:
⊠	Other, describe ULTRA LOW NOx BURNERS + SELECTIVE CATALYTIC REDUCTION  Manufacturer: NOT YET SELECTED  What do you call this control equipment: ULTRA LOW NOx BURNERS + SELECTIVE CATALYTIC REDUCTIVE Pollutant(s) controlled:  PE DO SO2 NOX DO Other  Estimated capture efficiency (%): 100  Design control efficiency (%): >88  Basis for efficiency: EPA

Section II - St	pecific Air	Contaminant	Source	Information

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☑ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

- 6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.
- 7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- · Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

	15000000000000000000000000000000000000	Table 7-A, Stack Egress Poi	nt Information			
Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
PRODUCT UPGRADE SYSTEM	А	ROUND 3.28 FT	75	700	36,000	700

<sup>\*</sup>Type codes for stack egress points:

- A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
- B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
- C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

		Table 7-B, Fugitive Egress Point Information			
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

<sup>\*</sup>Type codes for fugitive egress point:

- D. door or window
- E. other opening in the building without a duct
- F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Info	ormation (Add rows as ı	necessary)	
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
PRODUCT UPGRADE SYSTEM	328 (Gasifier)	120 (Gasifier)	1,400 (6 Gasifiers)

#### 8. Request for Federally Enforceable Limits

As part of this permit application	, do you wish to propose v	oluntary restrictions to	o limit emissions i	n order to avoid	specific
requirements listed below, (i.e., a	re you requesting federall	y enforceable limits to	obtain synthetic	minor status)?	

☐ yes

⊠ no

f.

not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

- to avoid being a major source (see OAC rule 3745-77-01) a.
- h to avoid being a major MACT source (see OAC rule 3745-31-01)
- to avoid being a major modification (see OAC rule 3745-31-01) C.
- to avoid being a major stationary source (see OAC rule 3745-31-01) d. П
- to avoid an air dispersion modeling requirement (see Engineering Guide #69) e. to avoid another requirement. Describe:

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
PRODUCT UPGRADE SYSTEM	NONE (ANALYTICAL TESTING OF FUEL GAS)	NONE (162 ppmv [3-hr avg.], 60 ppmv [daily avg], H₂S IN FUEL GAS	H₂S IN FUEL GAS

10.	Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?
	<ul> <li>□ yes - Note: notification requirements in rules cited above must be followed.</li> <li>☑ no</li> </ul>

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI #:

Reason this form is being submi	tted (check one)	
⊠ New Permit ☐ Renewa	ıl or Modification of Air Permit Num	nber(s) (e.g. B001)
Maximum Operating Schedule:	24 hours per day; 365 days per	year
If the schedule is less than 24 he maximum? See instructions for	ours/day or 365 days/year, what lir examples.	mits the schedule to less thar
Input Capacity (million Btu/hr):		
Rated (Indicate units if other than mmBtu/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBlu
24.0	24.0	24.0
Rated	Maximum	Normal
Output Capacity:  Rated (lb steam/hr)	Maximum (lb steam/hr)	Normal (Ib steam/hr)
Rated	F .	
Rated	(lb steam/hr)	
Rated (lb steam/hr)  Not applicable - operation de	(lb steam/hr)  Des not produce steam.	
Rated (lb steam/hr)  Not applicable - operation de	(lb steam/hr)  Des not produce steam.	
Rated (lb steam/hr)  Not applicable - operation de Percent of Operating Time Used Process: 100 %	(lb steam/hr)  Des not produce steam.	
Rated (lb steam/hr)  Not applicable - operation de Percent of Operating Time Used Process: 100 % Space Heat: 0 %	(lb steam/hr)  Des not produce steam.  I for: .	
Rated (lb steam/hr)  Not applicable - operation do Percent of Operating Time Used Process: 100 % Space Heat: 0 %  Type of Draft (check one):	(lb steam/hr)  Des not produce steam.  I for:  .	

8. Type o	f Fuel Fired (c	complete all t	hat apply	):			
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	Primary Backup				gal	gal	gal
Natural Gas	☐ Primary ☐ Backup	950		0.05	220 MMSCF	25,300 SCF	35,000 SCF
Wood	☐ Primary ☐ Backup		200000000000000000000000000000000000000		tons	lbs	lbs
LPG	Primary Backup				gal	gal	gal
Other**	☐ Primary☐ Backup	487.5	NIL	0.001	430 MMSCF	49,200 SCF	67,400 SCF
Other**	Primary Backup						
	entify all comb						
9. Type of	Coal Firing (c	check one):	Coai	l-Fired Uı	nits		
☐ Pulv	erized-Wet Bo erized-Dry Bo erfeed Stoker	ttom 🔲 Cyc	nd-Fired clones		<b>x</b>	Traveling Gra	b
10. Flyash f	Reinjection:						
☐ Yes	☐ No					-	
11. Overfire	Air:						
☐ Yes	☐ No				·		
12. Oil Preh	eater:		Oil-	Fired Uni	its		
☐ Yes ☐ No	- Indicate Ter	nperature	deg	ı. F			

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI #:

Reason this form is being subm	itted (check one)	
New Permit ☐ Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewater     Renewate	al or Modification of Air Permit Nur	mber(s) (e.g. B001)
	24 hours per day; 365 days pe	
If the schedule is less than 24 h	ours/day or 365 days/year, what li	
maximum? See instructions for	examples.	
Input Capacity (million Btu/hr):		
Rated (Indicate units if other than mmBtu/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBtu/hr
21.0	21.0	21.0
(lb steam/hr)	Maximum (lb steam/hr)	Normal (lb steam/hr)
Not applicable - operation do	oes not produce steam.	
Percent of Operating Time Used	for:	
Process: 100 % Space Heat:%		
Type of Draft (check one):		
☐ Natural ☐ Induced ☒ F	orced	
Type of combustion monitoring (	check one):	
Fuel/Air Ratio Oxygen Other (describe) TO BE DET		

o. Type or	ruei riteu (c	complete all t	nat appiy	) <del>.</del>			
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	Primary Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary 図 Backup	950	P. Jackson	0.05	195 MMSCF	22,100 SCF	30,300 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	ibs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	□ Primary     □ Backup	487.5	NIL	0.001	380 MMSCF	43,000 SCF	59,000 SCF
Other**	Primary Backup						
	entify all comb her fuel(s): T/		uels that a	are co-fire	od:		
9. Type of Pulve	Coal Firing (c erized-Wet Bo erized-Dry Bo erfeed Stoker	check one): ottom	nd-Fired lones	S	nain Grate oreader Stoker	☐ Traveling Gra	Ł
I0. Flyash F	Reinjection:	·		(	/		
☐ Yes	□No						
1. Overfire	Air:						
☐ Yes	☐ No						
2. Oil Prehe	eater:		Oil-l	Fired Uni	ts		
☐ Yes ·	- Indicate Ten	nperature	deg	. F			

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI #:

1.	Reason this form is being subm	itted (check one)	
	New Permit ☐ Renewa	al or Modification of Air Permit Nun	nber(s) (e.g. B001)
2.	Maximum Operating Schedule:	24 hours per day; 365 days per	· year
	If the schedule is less than 24 he maximum? See instructions for	ours/day or 365 days/year, what lir examples.	mits the schedule to less than
3.	Input Capacity (million Btu/hr):		
	Rated (Indicate units if other than mmBtu/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBtu/hr)
	20.0	20.0	20.0
	Rated (lb steam/hr)	Maximum (lb steam/hr)	Normal (lb steam/hr)
	Not applicable - operation do		
5.	Percent of Operating Time Used		
	Process: 100 % Space Heat:%		
6.	Type of Draft (check one):		
	☐ Natural ☐ Induced ☒ Fe	orced	
7.	Type of combustion monitoring (	check one):	
	☐ Fuel/Air Ratio ☐ Oxygen ☐ Other (describe) TO BE DET	☐ None ERMINED	

o. Type of	ruei rirea (d	complete all t	nat apply	):			
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	Primary Backup				gal	gal	gal
No. 6 Fuel Oil	Primary Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary 図 Backup	950		0.05	185 MMSCF	21,000 SCF	29,000 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	⊠ Primary □ Backup			0.001	360 MMSCF	41,000 SCF	56,200 SCF
Other**	☐ Primary ☐ Backup						
* Please idea ** Identify oth			uels that a	re co-fire	d:		<u></u>
9. Type of (	Coal Firing (c	heck one):	Coal	-Fired Ur	nits		
Pulve	rized-Wet Bo rized-Dry Bo rfeed Stoker	ottom   Har ttom   Cyc	lones	□ Sp	nain Grate preader Stoker )	Traveling Gra	t
10. Flyash R	einjection:						
☐ Yes	☐ No						-
11. Overfire A	Air:		•				
Yes	☐ No						
2. Oil Prehe	ater:		Oil-I	Fired Uni	ts		
☐ Yes -	Indicate Ten	nperature	deg	. F			

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

- Company identification (name for air contaminant source for which you are applying): FISCHER-TROPSCH CATALYST ROTARY DRYER
- List all equipment that are part of this air contaminant source: ROTARY DRYER WITH NITROGEN HEATER (4 MMBtu/hr) AND HOT OIL HEATER (4 MMBtu/hr)
- Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 OR after issuance of PTI

- 4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.
  - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
  - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
  - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit
    emissions in line # 8 or have described inherent limitations below.
  - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
  - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.18	0.18	0.8	0.18	0.8
PM <sub>10</sub> (PM < 10 microns in diameter)	0.18	0.18	0.8	0.18	0.8
Sulfur dioxide (SO₂)	0.02	0.02	0.08	0.02	0.08
Nitrogen oxides (NO <sub>x</sub> )	2.26	2.26	9.8	2.26	9.8
Carbon monoxide (CO)	1.8	1.8	8.4	1.8	8.4
Organic compounds (OC)	0.12	0.12	0.6	0.12	0.6
Volatile organic compounds (VOC)	0.12	0.12	0.6	0.12	0.6
Total HAPs	0.04	0.04	0.18	0.04	0.18
Highest single HAP: (hexane)	0.04	0.04	0.18	0.04	0.18
Air Toxics (see instructions):	0.04	0.04	0.18	0.04	0.18

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5.

Ø	No - proceed to item # 6.	
	Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = \$\text{Nitrogen oxides} = \text{NOx; Carbon monoxide} = CO	SO
	Cyclone/Multiclone	
	Manufacturer: Year installed:	
	Pollutant(s) controlled:	
	Estimated capture efficiency (%):  Basis for officiency (	
	Estimated capture efficiency (%):  Design control efficiency (%):  Basis for efficiency:  Basis for efficiency:	
	Type:   Cyclone   Multiclone   Rotoclone   Other  This is the only control or this six	
	Little is the only control equipment on this air contaminant source	
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel	
	List any other air contaminant sources that are also vented to this control equipment:	
	Fabric Filter/Baghouse	•
	Manufacturer: Year installed:	
	What do you call this control equipment:	
	What do you call this control equipment:  Pollutant(s) controlled:   PE  OC  SO <sub>2</sub> NOx CO Other  Estimated capture efficiency (%):	
	Estimated capture efficiency (%): Basis for efficiency:	
	Estimated capture efficiency (%):  Design control efficiency (%):  Operating pressure drop range (inches of water): Minimum:  Pressure type:  Design control efficiency (%):  Design control efficiency (%):  Basis for efficiency:  Maximum:	
	Pressure type:  Negative pressure Positive pressure	
	Treatment of the Proposition Proposition Proposition	
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other	
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ☐ Lime injection or fabric coating agent used: Type: Feed rate:	
	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source	
	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel	
	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source	
	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel	
	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber	
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed:  What do you call this control equipment:	
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other	
	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed: What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other Estimated capture efficiency (%): Basis for efficiency:	
	☐ Lime injection or fabric coating agent used: Type: Feed rate:   ☐ This is the only control equipment on this air contaminant source   If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel   List any other air contaminant sources that are also vented to this control equipment:    Wet Scrubber   Manufacturer: Year installed:   What do you call this control equipment:   Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other   Estimated capture efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:	
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	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed:	
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	☐ Lime injection of fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment: Want do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOX ☐ CO ☐ Other Estimated capture efficiency (%): ☐ Basis for efficiency: ☐ Design control efficiency (%): ☐ Basis for efficiency: ☐ Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ☐ Operating pressure drop range (inches of water): Minimum: ☐ Maximum: ☐ Ph range for scrubbing liquid: Minimum: ☐ Maximum: ☐ Scrubbing liquid flow rate (gal/min): ☐ Is scrubber liquid recirculated? ☐ Yes ☐ No	
	☐ Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed:	
	☐ Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment: Wanufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO2 ☐ NOX ☐ CO ☐ Other Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other Operating pressure drop range (inches of water): Minimum: Maximum: PH range for scrubbing liquid: Minimum: Maximum: Scrubbing liquid flow rate (gal/min): Is scrubber liquid recirculated? ☐ Yes ☐ No Water supply pressure (psig): NOTE: This item for spray chambers only. ☐ This is the only control equipment on this air contaminant source	
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コ	☐ Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment: Wanufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO2 ☐ NOX ☐ CO ☐ Other Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other Operating pressure drop range (inches of water): Minimum: Maximum: PH range for scrubbing liquid: Minimum: Maximum: Scrubbing liquid flow rate (gal/min): Is scrubber liquid recirculated? ☐ Yes ☐ No Water supply pressure (psig): NOTE: This item for spray chambers only. ☐ This is the only control equipment on this air contaminant source	
_	☐ Lime injection or rabric coating agent used: Type: ☐ Feed rate: ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel ☐ List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: ☐ Year installed: ☐ What do you call this control equipment: ☐ Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO2 ☐ NOX ☐ CO ☐ Other ☐ Estimated capture efficiency (%): ☐ Basis for efficiency: ☐ Design control efficiency (%): ☐ Basis for efficiency: ☐ Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ☐ Operating pressure drop range (inches of water): Minimum: ☐ Maximum: ☐ PH range for scrubbing liquid: Minimum: ☐ Maximum: ☐ Scrubbing liquid flow rate (gal/min): ☐ Is scrubber liquid recirculated? ☐ Yes ☐ No  Water supply pressure (psig): ☐ NOTE: This item for spray chambers only. ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel ☐ List any other air contaminant sources that are also vented to this control equipment:	
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_	☐ Infer injection or fabric coating agent used: Type: ☐ Feed rate: ☐ This is the only control equipment on this air contaminant source ☐ If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel ☐ List any other air contaminant sources that are also vented to this control equipment: ☐ Wet Scrubber ☐ Manufacturer: ☐ Year installed: ☐ What do you call this control equipment: ☐ Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO2 ☐ NOX ☐ CO ☐ Other ☐ Estimated capture efficiency (%): ☐ Basis for efficiency: ☐ Design control efficiency (%): ☐ Basis for efficiency: ☐ Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ☐ Operating pressure drop range (inches of water): Minimum: ☐ Maximum: ☐ PH range for scrubbing liquid: Minimum: ☐ Maximum: ☐ Maximum: ☐ Scrubbing liquid recirculated? ☐ Yes ☐ No ☐ Water supply pressure (psig): ☐ NOTE: This item for spray chambers only. ☐ This is the only control equipment on this air contaminant source ☐ If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel ☐ List any other air contaminant sources that are also vented to this control equipment: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
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	☐ Infer injection or fabric coating agent used: Type: ☐ Feed rate: ☐ This is the only control equipment on this air contaminant source ☐ If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel ☐ List any other air contaminant sources that are also vented to this control equipment: ☐ Wet Scrubber ☐ Manufacturer: ☐ Year installed: ☐ What do you call this control equipment: ☐ Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO2 ☐ NOX ☐ CO ☐ Other ☐ Estimated capture efficiency (%): ☐ Basis for efficiency: ☐ Design control efficiency (%): ☐ Basis for efficiency: ☐ Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ☐ Operating pressure drop range (inches of water): Minimum: ☐ Maximum: ☐ PH range for scrubbing liquid: Minimum: ☐ Maximum: ☐ Maximum: ☐ Scrubbing liquid recirculated? ☐ Yes ☐ No ☐ Water supply pressure (psig): ☐ NOTE: This item for spray chambers only. ☐ This is the only control equipment on this air contaminant source ☐ If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel ☐ List any other air contaminant sources that are also vented to this control equipment: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	

	Number of operating fields:	
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:	
	Concentrator	
	Manufacturer: Year installed: What do you call this control equipment:	
	What do you call this control equipment:	
	Pollutant(s) controlled:   PE   OC   SO <sub>2</sub> NOx   OO   Other Basis for efficiency:	-
	Minimum desorption air stream temperature (°F):	
	Rotational rate (revolutions/hour):  ☐ This is the only control equipment on this air contaminant source	
	If no, this control equipment is:  Primary  Secondary  Parallel List any other air contaminant sources that are also vented to this control equipment:	
	Catalytic Incinerator	
-	Manufacturer: Year installed:	
	What do you call this control equipment:	
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other	
	Fstimated capture efficiency (%):  Pagin for efficiency (	
	Estimated capture efficiency (%):  Design control efficiency (%):  Minimum inlet are temperature (%):  Basis for efficiency:  Basis for efficiency:	
	Minimum inlet gas temperature (°F):	
	Combustion chamber residence time (seconds):	
	Minimum temperature difference (°F) across catalyst during air contaminant source operation:	
	☐ This is the only control equipment on this air contaminant source	
	If no this control equipment in C. Diment C. C. C. C. C. C. C. C. C. C. C. C. C.	
	If no, this control equipment is:  Primary  Secondary Parallel	
	List any other air contaminant sources that are also vented to this control equipment:	
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer	
	Thermal Incinerator/Thermal Oxidizer  Manufacturer:  Year installed:	
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed:  What do you call this control equipment:	
	Thermal Incinerator/Thermal Oxidizer  Manufacturer: What do you call this control equipment: Pollutant(s) controlled:	
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled:  PE D OC D SO2 NOX D CO D Other  Estimated capture efficiency (%):  Basis for efficiency:	
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled:  PE D OC D SO2 NOX D CO D Other  Estimated capture efficiency (%):  Basis for efficiency:	
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed:  What do you call this control equipment:  Pollutant(s) controlled: PE OC SO <sub>2</sub> NOx CO Other  Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:  Minimum operating temperature (°F) and location:  (See line by line instructions)	ons.)
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Ye	ons.)
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Ye	ons.)
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Ye	ons.)
	Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year installed: Year insta	ons.)
	Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed: What do you call this control equipment:  Pollutant(s) controlled: PE DC SO2 NOX CO Other  Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Minimum operating temperature (°F) and location: (See line by line instruction to this is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:	ons.)
	Thermal Incinerator/Thermal Oxidizer  Manufacturer: Year installed: What do you call this control equipment:  Pollutant(s) controlled: PE DC SO2 NOX CO Other  Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Minimum operating temperature (°F) and location: (See line by line instruction to this is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:	ons.)
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer:	ons.)
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer:	ons.)
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer:	ons.)
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer:	ons.
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer:	ons.)
	List any other air contaminant sources that are also vented to this control equipment:  Thermal Incinerator/Thermal Oxidizer  Manufacturer:	ons.)
	Thermal Incinerator/Thermal Oxidizer  Manufacturer:	ons.)
	List any other air contaminant sources that are also vented to this control equipment:    Thermal Incinerator/Thermal Oxidizer	ons.)
	Thermal Incinerator/Thermal Oxidizer  Manufacturer:	ons.)
	List any other air contaminant sources that are also vented to this control equipment:    Thermal Incinerator/Thermal Oxidizer	ons.)

	Condenser
	Manufacturer: Year installed:
	What do you call this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%):  Basis for efficiency:  Position control efficiency (%):
	Design control efficiency (%): Basis for efficiency:
	Type: ☐ Indirect contact ☐ Direct contact
	Maximum exhaust gas temperature (°F) during air contaminant source operation:
	Coolant type:
	Coolant type: Design coolant temperature (°F): Minimum Maximum
	Design coolant flow rate (gpm):   ☐ This is the only control equipment on this air contaminant source
	☐ This is the only control equipment on this air contaminant source
	if no, this control equipment is:   Primary   Secondary   Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	Carbon Absorber
L-wi	
	Manufacturer: Year installed: What do you call this control equipment:
	Pollutant(s) controlled:   PE OC SO <sub>2</sub> NOx CO Other
	Estimated capture efficiency (%): Basis for efficiency:
	Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:
	Design control efficiency (%): Basis for efficiency:  Type:   On-site regenerative   Disposable
	Maximum design outlet organic compound concentration (ppmv):
	Carbon replacement frequency or regeneration cycle time (specify units):
	Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is:  Primary  Secondary  Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	y was an arrange that are also verted to this control equipment.
	Dry Scrubber
	Manufacturer: Year installed:
	What do you call this control equipment:
	Pollutant(s) controlled:   PE   OC   SO <sub>2</sub> NOx   CO   Other
	Estimated capture efficiency (%): Basis for efficiency:
	pesign control enciency (70). pasis for emciency:
	Reagent(s) used: Type: Injection rate(s):
	Reagent(s) used: Type: Injection rate(s): Operating pressure drop range (inches of water): Minimum: Maximum:
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	Paint booth filter
	Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other Design control efficiency (%): Basis for efficiency:
	Design control efficiency (%):  Basis for efficiency:
	Other, describe
	Manufacturer: Year installed:
	What do you call this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%): Basis for efficiency:
	Design control efficiency (%):
	Li This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:

- Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application.
   The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.
- 7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

		Table 7-A, Stack Egress Point Information						
Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code *	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)		
FISCHER-TROPSCH CATALYST ROTARY DRYER	А	ROUND 10-INCH ID	75	650	2,200	700		

<sup>\*</sup>Type codes for stack egress points:

- A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
- B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
- C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

	This way was a second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the s	Table 7-B, Fugitive Egress Point Information			
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

<sup>\*</sup>Type codes for fugitive egress point:

- D. door or window
- E. other opening in the building without a duct
- F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Inf	ormation (Add rows as	s necessary)	
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
FISCHER-TROPSCH CATALYST ROTARY DRYER	328 (GASIFIER)	120	1,400

3.	Request	t for	Federa	ally	Enforceable	Limits
----	---------	-------	--------	------	-------------	--------

⊠ no

as part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific equirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?	ific
equilibrium instea below, (i.e., are you requesting lederally enforceable limits to obtain synthetic minor status)?	
1 ves	

not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a.	to avoid being a major source (see OAC rule 3745-77-01)
b.	to avoid being a major MACT source (see OAC rule 3745-31-01)

- e. 

  to avoid an air dispersion modeling requirement (see Engineering Guide # 69)

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

□ yes - Note: notification requirements in rules cited above must be followed.
 ☑ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI #:

⊠ New Permit ☐ Renewa	l or Modification of Air Permit Nun	iber(s) (e.g. boo r)
Maximum Operating Schedule:	24 hours per day; 365 days per	year
	ours/day or 365 days/year, what lir	
maximum? See instructions for	examples.	
Input Capacity (million Btu/hr):		
Rated (Indicate units if other than mmBtu/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBtu/hr
4.0	4.0	4.0
(lb steam/hr)	(lb steam/hr)	(lb steam/hr)
(ib Steamin)	(in electricity)	(ib Steamin)
(in steamin)	in domini,	(ib steamin)
Not applicable - operation do		(ib sicannii)
	pes not produce steam.	(ib Steamin)
☑ Not applicable - operation do	pes not produce steam.	(ib Steamin)
Not applicable - operation do Percent of Operating Time Used Process: 100 %	pes not produce steam.	(ib Steamin)
Not applicable - operation do Percent of Operating Time Used Process: 100 % Space Heat: 0 %  Type of Draft (check one):	pes not produce steam.	(ID Steammin)
Not applicable - operation do Percent of Operating Time Used Process: 100 % Space Heat: 0 % Type of Draft (check one):	pes not produce steam.  for:	(ib Steamin)
Not applicable - operation do Percent of Operating Time Used Process: 100 % Space Heat: 0 %  Type of Draft (check one):  Natural ☐ Induced ☐ F	oes not produce steam.  for:  forced check one):	(Ib Steaming)

8. Type of	f Fuel Fired (d	complete all t	hat apply	·):			
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	Primary Backup				gal	gal	
Natural Gas	☐ Primary ☐ Backup	950		0.05	36.9 MMSCF	4,211 SCF	gal 4,211 SCF
Wood	Primary Backup		(*************************************		tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☐ Primary☐ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	☐ Primary ☐ Backup						
* Please ide	entify all comb	inations of fu	iels that a	are co-fire	d:		
** Identify ot	her fuel(s): TA	AILGAS OR 1	NATURAI	L GAS			
9. Type of	Coal Firing (c	heck one):	Coal	-Fired Ur	nits		
Pulve	erized-Wet Bo erized-Dry Bot erfeed Stoker	ottom	lones	Sp	nain Grate preader Stoker[ )	Traveling Gra	i
l0. Flyash R	Reinjection:						
Yes	☐ No						
1. Overfire	Air:						
☐ Yes	☐ No						
2. Oil Prehe	eater:		Oil-I	Fired Uni	ts		
☐ Yes - ☐ No	· Indicate Tem	nperature	deg	. F			

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI#:

Reason this form is being subm	itted (check one)	
New Permit ☐ Renewa	al or Modification of Air Permit Nun	nber(s) (e.g. B001)
Maximum Operating Schedule:	24 hours per day; 365 days per	year
	ours/day or 365 days/year, what lir examples.	
Input Capacity (million Btu/hr):		
Rated (Indicate units if other than mmB(u/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBtu
4.0	4.0	4.0
	Maximum	Normal
Output Capacity:  Rated (lb steam/hr)	Maximum (lb steam/hr)	Normal (lb steam/hr)
Rated	3	•
Rated	(ib steam/hr)	•
Rated (lb steam/hr)	(ib steam/hr) oes not produce steam.	•
Rated (lb steam/hr)  Not applicable - operation de	(ib steam/hr) oes not produce steam.	•
Rated (lb steam/hr)  Not applicable - operation de Percent of Operating Time Used Process: 100 %	(ib steam/hr) oes not produce steam.	•
Rated (lb steam/hr)  Not applicable - operation de Percent of Operating Time Used Process: 100 % Space Heat: 0 %  Type of Draft (check one):	(ib steam/hr) oes not produce steam.	•
Rated (lb steam/hr)  Not applicable - operation de Percent of Operating Time Used Process: 100 % Space Heat: 0 %  Type of Draft (check one):	(lb steam/hr) oes not produce steam. d for:	

8. Type of	Fuel Fired (d	complete all t	hat apply	):			
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	Primary Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	Primary Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF
Wood	Primary Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup		24		gal	gal	gal
Other**	☐ Primary☐ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	Primary Backup						
* Please ide	entify all comb	oinations of fu	uels that a	are co-fire	d:		
	her fuel(s): T/						
9. Type of	Coal Firing (c	·heck one)·	Coal	-Fired U	nits		
Pulve	erized-Wet Bo erized-Dry Bo erfeed Stoker	ottom	lones	□ S <sub>I</sub>	nain Grate oreader Stoker )	Traveling Gra	t
10. Flyash F	Reinjection:						
☐ Yes	☐ No	-					
11. Overfire	Air:						
☐ Yes	☐ No						
12. Oil Preh	eater:		Oil-	Fired Uni	ts		
	- Indicate Ten	nperature	deg	. F			

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

- 1. Company identification (name for air contaminant source for which you are applying): HYDROGEN STRIPPING HEATER (4 MMBtu/hr)
- 2. List all equipment that are part of this air contaminant source: HYDROGEN STRIPPING HEATER (4 MMBtu/hr)
- Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 OR after issuance of PTI \_\_\_\_\_

- 4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.
  - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
  - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
  - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit
    emissions in line # 8 or have described inherent limitations below.
  - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
  - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.09	0.09	0.4	0.09	0.4
PM₁₀ (PM < 10 microns in diameter)	0.09	0.09	0.4	0.09	0.4
Sulfur dioxide (SO <sub>2</sub> )	0.01	0.01	0.04	0.01	0.04
Nitrogen oxides (NO <sub>x</sub> )	1.13	1.13	4.9	1.13	4.9
Carbon monoxide (CO)	0.9	0.9	4.2	0.9	4.2
Organic compounds (OC)	0.06	0.06	0.3	0.06	0.3
Volatile organic compounds (VOC)	0.06	0.06	0.3	0.06	0.3
Total HAPs	0.02	0.02	0.09	0.02	0.09
Highest single HAP: (hexane)	0.02	0.02	0.09	0.02	0.09
Air Toxics (see instructions):	0.02	0.02	0.09	0.02	0.09

5.

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

	No - proceed to item # 6.		
	Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO; Nitrogen oxides = NOx; Carbon monoxide = CO		
	Cyclone/Multiclone		
	Manufacturer:Year installed:		
	What do you call this control equipment:		
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other		
	Estimated capture emidency (%): Basis for efficiency:		
	Design control efficiency (%): Basis for efficiency:		
	Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other		
	Li This is the only control equipment on this air contaminant source		
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel		
	List any other air contaminant sources that are also vented to this control equipment:		
J	Fabric Filter/Baghouse		
	Manufacturer: Year installed: What do you call this control equipment:		
	Pollutant(a) controlled:   DE   DE   DE   DE   DE   DE   DE   D		
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other		
	Estimated capture efficiency (%):  Basis for efficiency:  Design control efficiency (%):		
	Design Control englency 1761. Rasis for afficiancy		
	Operating pressure drop range (inches of water): Minimum: Maximum:  Pressure type:   Negative pressure  Positive pressure		
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other		
	The injection of fabric coating agent used: Type:		
	☐ Lime injection or fabric coating agent used: Type: Feed rate:		
	☐ This is the only control equipment on this air contaminant source		
	☐ Lime injection or fabric coating agent used: Type: Feed rate:		
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:		
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber		
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed:		
]	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer:		
]	☐ Lime injection or fabric coating agent used: Type: Feed rate:		☐ Lime injection of fabric coating agent used: Type: Feed rate:   ☐ This is the only control equipment on this air contaminant source   If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel   List any other air contaminant sources that are also vented to this control equipment:    Wet Scrubber
]	☐ Lime injection of fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other  Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:		
]	☐ Lime injection of fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed: What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other		
]	☐ Lime injection of fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed: What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other		
]	☐ Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber		
]	☐ Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber		
]	☐ Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment: Wanufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other Operating pressure drop range (inches of water): Minimum: Maximum: PH range for scrubbing liquid: Minimum: Maximum: Scrubbing liquid flow rate (gal/min): Is scrubber liquid recirculated? ☐ Yes ☐ No		
]	☐ Lime injection of fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed: ☐ What do you call this control equipment: ☐ Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other ☐ Estimated capture efficiency (%): ☐ Basis for efficiency: ☐ Design control efficiency (%): ☐ Basis for efficiency: ☐ Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ☐ Operating pressure drop range (inches of water): Minimum: ☐ Maximum: ☐ PH range for scrubbing liquid: Minimum: ☐ Maximum: ☐ Scrubbing liquid flow rate (gal/min): ☐ Is scrubber liquid recirculated? ☐ Yes ☐ No  Water supply pressure (psig): NOTE: This item for spray chambers only		
]	☐ Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed:		
3	☐ Lime injection or fabric coating agent used: Type: Feed rate: This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment: Wanufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Basis for efficiency: Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other Operating pressure drop range (inches of water): Minimum: Maximum: PH range for scrubbing liquid: Minimum: Maximum: Scrubbing liquid flow rate (gal/min): Is scrubber liquid recirculated? ☐ Yes ☐ No Water supply pressure (psig): NOTE: This item for spray chambers only		
]	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other Estimated capture efficiency (%): ☐ Basis for efficiency: ☐ Design control efficiency (%): ☐ Basis for efficiency: ☐ Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ☐ Operating pressure drop range (inches of water): Minimum: ☐ Maximum: ☐ pH range for scrubbing liquid: Minimum: ☐ Maximum: ☐ Scrubbing liquid flow rate (gal/min): ☐ Is scrubber liquid recirculated? ☐ Yes ☐ No ☐ Water supply pressure (psig): ☐ NOTE: This item for spray chambers only. ☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel		
	☐ Lime injection or fabric coating agent used: Type: Feed rate: ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:  Wet Scrubber  Manufacturer: Year installed: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO2 ☐ NOX ☐ CO ☐ Other Estimated capture efficiency (%): ☐ Basis for efficiency: ☐ Design control efficiency (%): ☐ Basis for efficiency: ☐ Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ☐ Operating pressure drop range (inches of water): Minimum: ☐ Maximum: ☐ PH range for scrubbing liquid: Minimum: ☐ Maximum: ☐ Scrubbing liquid flow rate (gal/min): ☐ Is scrubber liquid recirculated? ☐ Yes ☐ No ☐ Water supply pressure (psig): ☐ NOTE: This item for spray chambers only. ☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel		

ection II	<ul> <li>Specific Air Contaminant Source Informatio</li> </ul>	<u>n</u>	
	Estimated capture efficiency (%):	Basis for efficiency:	
	Design control efficiency (%):	Basis for efficiency:	
	Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubul Number of operating fields:	ar □ Wet □ Other	
	☐ This is the only control equipment on thi If no, this control equipment is: ☐ Primar List any other air contaminant sources that	V П Secondary П Parallel	ipment:
	Concentrator		
	Manufacturer: What do you call this control equipment:	Year installed:	
	Pollutant(s) controlled: G. DE G. CO.	F 60 F 110	
	Pollutant(s) controlled:  PE  OC Estimated capture efficiency (%):	□ SO <sub>2</sub> □ NOx □ CO	☐ Other
	Estimated capture efficiency (%):  Design regeneration cycle time (minutes):	_ basis for efficiency;	
	Minimum desorption air stream temperature	\(^0C\).	
	Rotational rate (revolutions/hour):	s(r)	
	Rotational rate (revolutions/hour):  ☐ This is the only control equipment on this	air contaminant course	
	If no, this control equipment is:   Primary	s all contaminant source	
	List any other air contaminant sources that	are also vented to this control ocui	nmant.
			pinent:
	Catalytic Incinerator		
		Voor installed.	
	What do you call this control equipment:	_ Year installed:	
	Pollutant(s) controlled: PE OC	DSO DNO: DOO	- OI
	Estimated capture efficiency (%):	Boois for officiency:	☐ Other
	Design control efficiency (%):  Minimum inlet gas temperature (%E):	Basis for efficiency:	
	Minimum inlet gas temperature (°F):		
	Combustion chamber residence time (secon	nde).	
	Minimum temperature difference (°F) across	s catalyst during air contaminant so	VISO operation
	C This is the only control equipment on this	air contaminant source	dice operation:
	if no, this control equipment is: Primary	☐ Secondary ☐ Parallel	
	List any other air contaminant sources that a	are also vented to this control equip	oment:
	Thermal Incinerator/Thermal Oxidizer		
	Manufacturer:	Year installed:	
	What do you call this control equipment:		
	Pollutant(s) controlled: T PF T OC	□ SO <sub>2</sub> □ NO <sub>X</sub> □ CO	☐ Other
	Estimated capture efficiency (%):	Basis for efficiency:	
	Design control efficiency (%):  Minimum operating temperature (°F) and loc Combustion chamber residence time (secon	Basis for efficiency:	
	Combustion observating temperature (°F) and loc	ation:	(See line by line instructions.
	Combustion chamber residence time (secon	ds):	·
	☐ This is the only control equipment on this	air contaminant source	
	If no, this control equipment is:  Primary	☐ Secondary ☐ Parallel	•
	List any other air contaminant sources that a	re also vented to this control equip	ment:
	Flare		
	Manufacturer:	Year installed:	
	Manufacturer: What do you call this control equipment:		
	Foliutantits) controlled: 17 PF		□ Other
	Estimated capture efficiency (%):	Basis for efficiency:	hand 51 1 541
	Design control efficiency (%):	Basis for efficiency:	
	Type: ☐ Enclosed ☐ Elevated (open)		
	Ignition device:   Electric arc  Pilot flan	ne	
	Flame presence sensor: ☐ Yes ☐ No		
	☐ This is the only control equipment on this	air contaminant source	

- Specific Air Contaminant Source Information  If no, this control equipment is: □ Primary □ Secondary □ Parallel  List any other air contaminant sources that are also vented to this control equipment:
Condenser  Manufacturer: Year installed: What do you call this control equipment:
Pollutant(s) controlled:   PE OC SO <sub>2</sub> NOx CO Other  Estimated capture efficiency (%):  Design control efficiency (%):  Basis for efficiency:
Type: Indirect contact Direct contact  Maximum exhaust gas temperature (°F) during air contaminant source operation:  Coolant type:  Design coolant temperature (°F): Minimum  Maximum
Design coolant flow rate (gpm):  ☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
Carbon Absorber  Manufacturer: Year installed:
Pollutant(s) controlled:  PE   OC   SO <sub>2</sub> NOx   O   Other   Estimated capture efficiency (%): Basis for efficiency:
Type:  On-site regenerative Disposable  Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify upits):
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:
Dry Scrubber  Manufacturer: Year installed:
What do you call this control equipment:  Pollutant(s) controlled:   PE   OC   SO <sub>2</sub> NOx   CO   Other  Estimated capture efficiency (%):  Resis for efficiency:
Reagent(s) used: Type: Basis for efficiency: Injection rate(s): Operating pressure drop range (inches of water): Minimum: Maximum:
☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
Paint booth filter  Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other  Design control efficiency (%): Basis for efficiency:
Other, describe  Manufacturer:  What do you call this control equipment:
Pollutant(s) controlled:   PE   OC   SO <sub>2</sub> NOx   CO   Other  Estimated capture efficiency (%):  Basis for efficiency:
Design control efficiency (%): Basis for efficiency:

Section II - Specific Air Contaminant	Source	Information
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☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:

- Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application.
  The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.
- 7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- · Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

	000000000000000000000000000000000000000	Table 7-A, Stack Egress Poi	int Information		-	,
Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 Inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
HYDROGEN STRIPPING HEATER	А	ROUND 10-INCH ID	75	650	2,200	700

<sup>\*</sup>Type codes for stack egress points:

- A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
- B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
- C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

	denner en en en en en en en en en en en en en	Table 7-B, Fugitive Egress Point Information	Anna Anna Anna Anna Anna Anna Anna Anna		
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for	fugitive egress point:
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D. door or window

E. other opening in the building without a duct

F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional	Information (Add rows as	s necessary)		
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)	
HYDROGEN STRIPPING HEATER	328 (GASIFIER)	120	1,400	

Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific
requirements listed below (i.e. are you requesting federally and a visit of the difference of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of th
requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes

⊠ no

not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

- a. to avoid being a major source (see OAC rule 3745-77-01)
- b. □ to avoid being a major MACT source (see OAC rule 3745-31-01)
- c. U to avoid being a major modification (see OAC rule 3745-31-01)
- d. D to avoid being a major stationary source (see OAC rule 3745-31-01)
- e. 

  to avoid an air dispersion modeling requirement (see Engineering Guide # 69)

f. 

to avoid another requirement. Describe:

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

 If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

□ yes - Note: notification requirements in rules cited above must be followed.
 □ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE FACILITY ID:	
EU ID;	PTI #:

Reason this form is being submi	tted (check one)	
🛚 New Permit 🔲 Renewa	l or Modification of Air Permit Nun	nber(s) (e.g. B001)
Maximum Operating Schedule:	24 hours per day; 365 days per	year
If the schedule is less than 24 ho	ours/day or 365 days/year, what lin	mits the schedule to less than
maximum? See instructions for	examples.	V 17000
Input Capacity (million Btu/hr):		
Rated (Indicate units if other than mmBtu/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBtu/h
4.0	4.0	4.0
Output Capacity:  Rated	Maximum	Normal
· · · ·	Maximum (lb steam/hr)	Normal (lb steam/hr)
Rated		1
Rated	(lb steam/hr)	1
Rated (lb steam/hr)	(lb steam/hr)  Des not produce steam.	1
Rated (lb steam/hr)  Not applicable - operation do	(lb steam/hr)  Des not produce steam.	1
Rated (lb steam/hr)  Not applicable - operation do Percent of Operating Time Used Process: 100 %	(lb steam/hr)  Des not produce steam.	1
Rated (lb steam/hr)  Not applicable - operation do Percent of Operating Time Used Process: 100 % Space Heat: 0 %	(lb steam/hr)  Des not produce steam.  for:	1
Rated (lb steam/hr)  Not applicable - operation do Percent of Operating Time Used Process: 100 % Space Heat: 0 %  Type of Draft (check one):	(lb steam/hr)  Des not produce steam.  for:	1

<ol><li>Type of</li></ol>	Fuel Fired (c	omplete all t	hat apply	):			•
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	Primary Backup				gal	gal	gal
No. 6 Fuel Oil	Primary Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	· gal	gal
Natural Gas	☐ Primary 図 Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	⊠ Primary □ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	☐ Primary ☐ Backup						
* Please ide	entify all comb	inations of fu	uels that a	are co-fire	ed:		
** Identify ot	her fuel(s): T/	AILGAS OR I	NATURA	L GAS			
9. Type of	Coal Firing (c	heck one):	Coal	l-Fired Uı	nits		
Pulve	erized-Wet Bo erized-Dry Bo erfeed Stoker	ttom 🔲 Cyc	lones	☐ S <sub>l</sub>		Traveling Gra	Ł
10. Flyash F	Reinjection:						
Yes	☐ No						
I1. Overfire	Air:						
Yes	☐ No						
2. Oil Prehe	eater:		Oil-	Fired Uni	its		
☐ Yes	- Indicate Ten	nperature	deg	ı. F			

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

- Company identification (name for air contaminant source for which you are applying): OXIDATION GAS HEATER (4 MMBtu/hr)
- 2. List all equipment that are part of this air contaminant source: OXIDATION GAS HEATER (4 MMBtu/hr)
- Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 OR after issuance of PTI \_\_\_\_\_

- 4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.
  - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
  - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
  - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
  - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
  - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.09	0.09	0.4	0.09	0.4
PM <sub>10</sub> (PM < 10 microns in diameter)	0.09	0.09	0.4	0.09	0.4
Sulfur dioxide (SO <sub>2</sub> )	0.01	0.01	0.04	0.01	0.04
Nitrogen oxides (NO <sub>x</sub> )	1.13	1.13	4.9	1.13	4.9
Carbon monoxide (CO)	0.9	0.9	4.2	0.9	4.2
Organic compounds (OC)	0.06	0.06	0.3	0.06	0.3
Volatile organic compounds (VOC)	0.06	0.06	0.3	0.06	0.3
Total HAPs	0.02	0.02	0.09	0.02	0.09
Highest single HAP: (hexane)	0.02	0.02	0.09	0.02	0.09
Air Toxics (see instructions):	0.02	0.02	0.09	0.02	0.09

<u>Section II - Specific Air Contaminant</u>	Source	Information
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Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5.	Does this air contaminant source employ emissions control equipment?									
		Yes - fill out the applicable information below.								
	×	No - proceed to item # 6.								
		Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO <sub>2</sub> ; Nitrogen oxides = NOx; Carbon monoxide = CO								
·		Cyclone/Multiclone Year installed:   Manufacturer: Year installed:   What do you call this control equipment:								
		Fabric Filter/Baghouse  Manufacturer:								
		Manufacturer:								
_	]	Electrostatic Precipitator  Manufacturer: Year installed:  What do you call this control equipment:  Pollutant(s) controlled:   PE   OC   SO <sub>2</sub>   NOx   CO   Other								

ection i	Estimated capture efficiency (%): Design control efficiency (%): Type:   Plate-wire   Flat-plate   Tubular   Wet   Other Number of operating fields: This is the only control equipment on this air contaminant source If no, this control equipment is:   Primary   Secondary   Parallel List any other air contaminant sources that are also vented to this control equipment:
	Concentrator  Manufacturer:
	Catalytic Incinerator  Manufacturer: What do you call this control equipment: Pollutant(s) controlled: PE
	Thermal Incinerator/Thermal Oxidizer  Manufacturer:
	Flare  Manufacturer: Year installed:  What do you call this control equipment:  Pollutant(s) controlled: □ PE □ OC □ SO₂ □ NOx □ CO □ Other  Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:  Type: □ Enclosed □ Elevated (open) Ignition device: □ Electric arc □ Pilot flame Flame presence sensor: □ Yes □ No □ This is the only control equipment on this air contaminant source

	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
	Condenser  Manufacturer: Year installed: What do you call this control equipment:
	Pollutant(s) controlled:   PE DOC SO <sub>2</sub> NOX CO Other  Estimated capture efficiency (%):  Basis for efficiency:  Basis for efficiency:
	Type: Indirect contact Direct contact  Maximum exhaust gas temperature (°F) during air contaminant source operation:  Coolant type:
	Coolant type:  Design coolant temperature (°F): Minimum Maximum  Design coolant flow rate (gpm):
	☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:
	Carbon Absorber
	Manufacturer: Year installed: What do you call this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Design control efficiency (%): Basis for efficiency:
	Type: ☐ On-site regenerative ☐ Disposable
	Maximum decide outlet execute annual annual site (
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):
	Maximum design outlet organic compound concentration (ppmv): Carbon replacement frequency or regeneration cycle time (specify units): Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:  Dry Scrubber
	Maximum design outlet organic compound concentration (ppmv): Carbon replacement frequency or regeneration cycle time (specify units): Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment:  Dry Scrubber Manufacturer: Year installed:
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:  Manufacturer:  Year installed:  What do you call this control equipment:  Pollutant(s) controlled:  PE  OC  SO2  NOX  CO  Other
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:  Dry Scrubber  Manufacturer:  Year installed:  What do you call this control equipment:  Pollutant(s) controlled:  PE  OC  SO <sub>2</sub> NOx  CO  Other  Estimated capture efficiency (%):  Basis for efficiency:
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:  Dry Scrubber  Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled:  PE  OC  SO <sub>2</sub> NOX  CO  Other  Estimated capture efficiency (%):  Basis for efficiency:  Design control efficiency (%):  Basis for efficiency:  Basis for efficiency:
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is: Primary Secondary Parallel  List any other air contaminant sources that are also vented to this control equipment:  Dry Scrubber  Manufacturer: What do you call this control equipment: Pollutant(s) controlled: PE OC SO2 NOX CO Other  Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Reagent(s) used: Type: Injection rate(s): Operating pressure drop range (inches of water): Minimum:  Maximum:
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:  Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled:  PE  OC  SO2  NOX  CO  Other  Estimated capture efficiency (%):  Basis for efficiency:  Design control efficiency (%):  Basis for efficiency:  Neagent(s) used: Type:  Injection rate(s):  Operating pressure drop range (inches of water): Minimum:  Maximum:  This is the only control equipment on this air contaminant source
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is: Primary Secondary Parallel  List any other air contaminant sources that are also vented to this control equipment:  Dry Scrubber  Manufacturer: What do you call this control equipment: Pollutant(s) controlled: PE OC SO2 NOX CO Other  Estimated capture efficiency (%): Basis for efficiency: Design control efficiency (%): Reagent(s) used: Type: Injection rate(s): Operating pressure drop range (inches of water): Minimum:  Maximum:
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:  Dry Scrubber  Manufacturer:  Year installed:  What do you call this control equipment:  Pollutant(s) controlled:  PE  OC  SO <sub>2</sub> NOX  CO  Other  Estimated capture efficiency (%):  Basis for efficiency:  Design control efficiency (%):  Basis for efficiency:  Reagent(s) used: Type:  Injection rate(s):  Operating pressure drop range (inches of water): Minimum:  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:
_	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:  What do you call this control equipment:  Pollutant(s) controlled:  PE  OC  SO2  NOX  CO  Other  Estimated capture efficiency (%):  Basis for efficiency:  Design control efficiency (%):  Basis for efficiency:  Neagent(s) used: Type:  Injection rate(s):  Operating pressure drop range (inches of water): Minimum:  This is the only control equipment on this air contaminant source  If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:
_	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is: Primary Secondary Parallel  List any other air contaminant sources that are also vented to this control equipment:  What do you call this control equipment:  Pollutant(s) controlled: PE OC SO2 NOX CO Other  Estimated capture efficiency (%):  Design control efficiency (%):  Basis for efficiency:  Operating pressure drop range (inches of water): Minimum: Maximum:  This is the only control equipment on this air contaminant source  If no, this control equipment is: Primary Secondary Parallel  List any other air contaminant sources that are also vented to this control equipment:  Paint booth filter  Type: Paper Fiberglass Water curtain Other  Design control efficiency (%):  Basis for efficiency:  Basis for efficiency:  Other, describe
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is: Primary Secondary Parallel  List any other air contaminant sources that are also vented to this control equipment:    Poly Scrubber
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is: Primary Secondary Parallel  List any other air contaminant sources that are also vented to this control equipment:  Dry Scrubber  Manufacturer: Year installed:  What do you call this control equipment:  Pollutant(s) controlled: PE OC SO2 NOX CO Other  Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:  Reagent(s) used: Type: Injection rate(s):  Operating pressure drop range (inches of water): Minimum: Maximum:  This is the only control equipment on this air contaminant source  If no, this control equipment is: Primary Secondary Parallel  List any other air contaminant sources that are also vented to this control equipment:  Paint booth filter  Type: Paper Fiberglass Water curtain Other  Design control efficiency (%): Basis for efficiency:  Other, describe  Manufacturer: Year installed:  What do you call this control equipment:
	Maximum design outlet organic compound concentration (ppmv):  Carbon replacement frequency or regeneration cycle time (specify units):  Maximum temperature of the carbon bed, after regeneration (including any cooling cycle):  This is the only control equipment on this air contaminant source  If no, this control equipment is: Primary Secondary Parallel  List any other air contaminant sources that are also vented to this control equipment:    Poly Scrubber

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

- Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application.
   The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.
- 7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per vear
- Nitrogen Oxides (NOx): 25 tons per year
- · Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information												
Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)						
OXIDATION GAS HEATER	Α	ROUND 10-INCH ID	75									

<sup>\*</sup>Type codes for stack egress points:

- A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
- B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
- C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information								
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)			
NA				U S SANS TORU SECURIORISM				

\*Type codes for fugitive egress point:

- D. door or window
- E. other opening in the building without a duct
- F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

•		•		
Table 7-C, Egress Point Additiona	Information (Add rows as	formation (Add rows as necessary)		
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)	
OXIDATION GAS HEATER	328 (GASIFIER)	120	1,400	
8. Request for Federally Enforceable Lim	nits			
As part of this permit application, do y requirements listed below, (i.e., are yo	ou wish to propose voluntar u requesting federally enfor	ry restrictions to limit el ceable limits to obtain	missions in order to avoid specific synthetic minor status)?	
□ yes ⊠ no				

If yes, why are you requesting federally enforceable limits? Check all that apply.

- c. to avoid being a major modification (see OAC rule 3745-31-01)
- d. □ to avoid being a major stationary source (see OAC rule 3745-31-01)
- e. 

  to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
- f. 

  to avoid another requirement. Describe:

not sure - please contact me if this affects me

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			1 2

10.	Do you wish to permit this air cont	taminant source as a portable source,	, allowing relocation within the state in accordance
	with OAC rule 3745-31-03 or OAC	C rule 3745-31-05?	

□ yes - Note: notification requirements in rules cited above must be followed.
 ⋈ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI#:

nis emissions unit wnich are i	not included in this list				
Reason this form is being	submitted (check one)				
⊠ New Permit □ R	enewal or Modification of Air Permit Nur	mber(s) (e.g. B001)			
Maximum Operating Sche	dule: 24 hours per day; 365 days pe	r year			
If the schedule is less that maximum? See instructio	n 24 hours/day or 365 days/year, what li ns for examples.				
Input Capacity (million Btu	Input Capacity (million Btu/hr):				
Rated (Indicate units if other than mmBt	Maximum (Indicate units if other than mmBtw/hr)	Normal (Indicate units if other than mmBtu/hr)			
4.0	4.0	4.0			
Rated (lb steam/hr)	Maximum (lb steam/hr)	Normal (lb steam/hr)			
Not applicable - operat	tion does not produce steam.				
Percent of Operating Time					
Process: 100 % Space Heat: 0 %					
Type of Draft (check one):					
	Forced				
Type of combustion monito					
	oring (check one):				

<ol><li>Type of</li></ol>	f Fuel Fired (c	complete all t	hat apply	):			
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	Primary Backup				gal	gal	gal
Natural Gas	☐ Primary ☐ Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☑ Primary ☐ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	☐ Primary ☐ Backup						
* Please ide	entify all comb	pinations of f	uels that a	are co-fire	ed:		
** Identify ot	her fuel(s): T	AILGAS OR	NATURA	L GAS			
9. Type of	Coal Firing (c	heck one):	Coa	l-Fired U	nits		
☐ Pulv	erized-Wet Bo erized-Dry Bo erfeed Stoker	ottom  Har ttom  Cyc	lones	□ s	hain Grate preader Stoker	☐ Traveling Gra☐ Fluidized Bed	b
10. Flyash F	Reinjection:						
☐ Yes	□No						
11. Overfire	Air:						
☐ Yes	□No						
12. Oil Preh	eater:		Oil-	Fired Un	its		
☐ Yes ☐ No	- Indicate Ter	mperature	deg	J. F			

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

- Company identification (name for air contaminant source for which you are applying): REDUCTION GAS HEATER (4 MMBtu/hr)
- 2. List all equipment that are part of this air contaminant source: REDUCTION GAS HEATER (4 MMBtu/hr)
- Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 OR after issuance of PTI \_\_\_\_\_\_

- 4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.
  - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
  - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
  - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
  - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
  - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.09	0.09	0.4	0.09	0.4
PM <sub>10</sub> (PM < 10 microns in diameter)	0.09	0.09	0.4	0.09	0.4
Sulfur dioxide (SO <sub>2</sub> )	0.0	0.0	0.0	0.0	0.0
Nitrogen oxides (NO <sub>x</sub> )	1.13	1.13	4.9	1.13	4.9
Carbon monoxide (CO)	0.9	0.9	4.2	0.9	4.2
Organic compounds (OC)	0.06	0.06	0.3	0.06	0.3
Volatile organic compounds (VOC)	0.06	0.06	0.3	0.06	0.3
Total HAPs	0.02	0.02	0.09	0.02	0.09
Highest single HAP: (hexane)	0.02	0.02	0.09	0.02	0.09
Air Toxics (see instructions):	0.02	0.02	0.09	0.02	0.09

Section II - Specific Air Contaminant Source Information
----------------------------------------------------------

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

	oes this air contaminant source employ emissions control equipment?
	Yes - fill out the applicable information below.
×	No - proceed to item # 6.
	Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = S Nitrogen oxides = NOx; Carbon monoxide = CO
	Manufacturer: Year installed:
	what do you call this control editibuteut.
	Pollutant(s) controlled: PE DOC DSO <sub>2</sub> DNOx DCO Dother
	Easis for efficiency:
	Basis for afficiency
	Type. $\square$ Cyclone $\square$ Multicione $\square$ Rotocione $\square$ Other
	Lights is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	Manufacturer: Year installed:
	Manufacturer: Year installed:
	Folidani(s) controlled: LIPE LIDC IISO <sub>2</sub> II NOx II CO II Other
	Loundage Capitale Elliciency (%). Rocie for officionore
	Design control efficiency (%):  Design control efficiency (%):  Design control efficiency (%):  Design control efficiency (%):  Basis for efficiency:  Operating pressure drop range (inches of water): Minimum:  Pressure type: Operative pressure of Design control efficiency:
	Operating pressure drop range (inches of water): Minimum:Maximum:
	COOCOTO TIPO. EL MOURINE DIESSURE I L'ENSINA NIAGRITA
	Fabric cleaning mechanism:  Reverse air  Pulse jet  Shaker  Other
	Line injection of labric coating agent used: Type: Feed rate.
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:
	——————————————————————————————————————
	Wet Scrubber
	Manufacturer: Year installed:
	Wildligg volucial this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%):  Design control efficiency (%):  Type:   Spray chamber   Packed bed  Impingement  Venturi  Other  Operating pressure drop range (inches of water): Minimum:
	Design control efficiency (%): Basis for efficiency:
	Operating pressure does not be a limited by the limited pressure does not be a limited by the limited pressure does not be a limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the limited by the l
	- Faramis brosonia grap rando financis al Materi Millimital
	pH range for scrubbing liquid: Minimum: Maximum: Scrubbing liquid flow rate (col/min):
	Scrubbing liquid flow rate (gal/min):  Is scrubber liquid recirculated?   Yes  No
	Mater supply pressure (poid): NOTE: The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the stat
	Water supply pressure (psig):NOTE: This item for spray chambers only.  ☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is:   Primary   Secondary   Parallel
	List any other air contaminant sources that are also vented to this control equipment:
<b>,</b> -,	Charles at att a Paris to a
	Electrostatic Precipitator
	Electrostatic Precipitator  Manufacturer: Year installed:
	Electrostatic Precipitator  Manufacturer: Year installed:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other

tion II -	Estimated capture efficiency (%): Basis for efficiency:  Design control efficiency (%): Basis for efficiency:  Type: □ Plate-wire □ Flat-plate □ Tubular □ Wet □ Other
	Number of operating fields:  This is the only control equipment on this air contaminant source If no, this control equipment is:  Primary  Secondary  Parallel  List any other air contaminant sources that are also vented to this control equipment:
	Concentrator
	Manufacturer: Year installed:
	Manufacturer: Year installed: What do you call this control equipment:  Pollutant(s) controlled: □ PE □ OC □ SO₂ □ NOx □ CO □ Other  Estimated capture efficiency (%): □ Basis for efficiency:
	Design regeneration cycle time (minutes):  Minimum desorption air stream temperature (°F):  Rotational rate (revolutions/hour):
	☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment:
	Catalytic Incinerator
	Manufacturer: Year installed:
	What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Pollutant(s) controlled:   PE   UC   SO <sub>2</sub>   NOX   CO   Other
	Estimated capture efficiency (%):  Design control efficiency (%):  Minimum inlet gas temperature (°F):  Basis for efficiency:  Basis for efficiency:
	Minimum inlet gas temperature (°F):
	Combustion chamber residence time (seconds):
	Minimum temperature difference (°F) across catalyst during air contaminant source operation:
	☐ This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
	List any other air contaminant sources that are also vented to this control equipment.
	Thermat Incinerator/Thermal Oxidizer  Manufacturer: Year installed:
	Manufacturer: Year installed: What do you call this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other
	Estimated capture efficiency (%): Basis for efficiency:
	Design control efficiency (%): Basis for efficiency:
	winimum operating temperature ( F) and location: (See line by line instructions
	Combustion chamber residence time (seconds):  This is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
L	Flare Manufacturer
	Manufacturer: Year installed: What do you call this control equipment:
	Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controlled:   Pollutant(s) controll
	Estimated capture efficiency (%): Basis for efficiency:
	Design control efficiency (%):
	Type: ☐ Enclosed ☐ Elevated (open)
	Ignition device: ☐ Electric arc ☐ Pilot flame
	Flame presence sensor: ☐ Yes ☐ No
	☐ This is the only control equipment on this air contaminant source

If no, the List and List and List	nis control equipment is:   Primary other air contaminant sources that a	☐ Secondary ☐ Parallel re also vented to this control equi	ipment:
Polluta Estima	r acturer: o you call this control equipment: nt(s) controlled: □ PE □ OC ted capture efficiency (%): control efficiency (%):	☐ SO <sub>2</sub> ☐ NOx ☐ CO Basis for efficiency:	Other
Type:   Maximu Coolan Design Design ☐ This If no, th	☐ Indirect contact ☐ Direct contact im exhaust gas temperature (°F) during type:  coolant temperature (°F): Minimum _ coolant flow rate (gpm):  is the only control equipment on this is control equipment is: ☐ Primary other air contaminant sources that are	ng air contaminant source operati  Maximum  air contaminant source  Secondary Parallel	ion:
Pollutar Estimat Design Type: [ Maximu Carbon Maximu ☐ This If no, th	cturer:  composite you call this control equipment:  composite controlled:  control efficiency (%):  control efficiency (%):  Con-site regenerative  compound composite replacement frequency or regeneration temperature of the carbon bed, after is the only control equipment on this are control equipment is:  control equipment is:  Control equipment is:  Control equipment and are contaminant sources that and control equipment are contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources that and contaminant sources	□ SO <sub>2</sub> □ NOx □ CO  Basis for efficiency:  Basis for efficiency:  e concentration (ppmv):  on cycle time (specify units):  er regeneration (including any code  air contaminant source  □ Secondary □ Paraliel	Other
Pollutan Estimate Design e Reagen Operatir □ This If no, thi	cturer:o you call this control equipment:	□ SO <sub>2</sub> □ NOx □ CO Basis for efficiency: Basis for efficiency: Injection rate(s): er): Minimum: Maximair contaminant source □ Secondary □ Parallel	um:
☐ Paint booth Type: ☐ Design o	ı filter 1 Paper □ Fiberglass □ Water curt control efficiency (%):	tain ☐ Other Basis for efficiency:	
What do Pollutan Estimate	ribe sturer: you call this control equipment: i(s) controlled: ☐ PE ☐ OC ed capture efficiency (%):	Year installed: CO SO₂ □ NOx □ CO Basis for efficiency:	☐ Other

☐ This is the only control equipment on this air contaminant source					
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel					
List any other air contaminant sources that are also vented to this control equipment:					

- 6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.
- 7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- · Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information						
Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
REDUCTION GAS HEATER	Α.	ROUND 10-INCH ID	75	650	2,200	700

<sup>\*</sup>Type codes for stack egress points:

- A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
- B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
- C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information							
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)		
NA NA							

\*Type codes for fugitive egress point:

D. door or window

E. other opening in the building without a duct

F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)							
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)				
REDUCTION GAS HEATER	328 (GASIFIER)	120	1,400				

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid	
requirements listed below (i.e. are used to propose to darkary restrictions to little emissions in order to avoid	1 specific
requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?	

☐ yes ☑ no

☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

b. to avoid being a major MACT source (see OAC rule 3745-31-01)

c. to avoid being a major modification (see OAC rule 3745-31-01)

e. 

to avoid an air dispersion modeling requirement (see Engineering Guide # 69)

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

 If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, - Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, a with OAC rule 3745-31-03 or OAC rule 3745-31-05?	allowing relocation within the state in accordance
-----------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------

yes - Note: notification requirements in rules cited above must be followed.

⊠ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI #:

# EMISSIONS ACTIVITY CATEGORY FORM FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

to th	is emissions unit which are not inc	luded in this list	
1.	Reason this form is being submi	tted (check one)	
	New Permit  ☐ Renewa	l or Modification of Air Permit Nun	nber(s) (e.g. B001)
2.	Maximum Operating Schedule:	24 hours per day; 365 days per	year
	If the schedule is less than 24 homaximum? See instructions for	ours/day or 365 days/year, what linexamples.	
3.	Input Capacity (million Btu/hr):		
	Rated (Indicate units if other than mmBtu/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBtu/hr)
	4.0	4.0	4.0
	Rated (lb steam/hr)	Maximum (lb steam/hr)	Normal (lb steam/hr)
	Not applicable - operation do	oes not produce steam.	
5.	Percent of Operating Time Used	l for:	
	Process: 100 % Space Heat: 0 %		
6.	Type of Draft (check one):		
	Natural □ Induced □ F	orced	
7.	Type of combustion monitoring (	check one):	
	☐ Fuel/Air Ratio ☐ Oxygen ☐ Other (describe) TO BE DE	☐ None 「ERMINED	

გ	Type of	huel hired (c	omplete all th	nat apply)	:				
F	<sup>-</sup> uel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use	
Coal		☐ Primary ☐ Backup				tons	lbs	lbs	
No. 2	Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal	
No. 6	Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal	
Other*	r* Oil	☐ Primary ☐ Backup				gal	gal	gal	
Natura	al Gas	☐ Primary ☑ Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF	
Wood		☐ Primary ☐ Backup				tons	lbs	lbs	
LPG		☐ Primary ☐ Backup				gal	gal	gal	
Other*	r <b>k</b>	⊠ Primary □ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF	
Other*	r#	☐ Primary ☐ Backup							
		ntify all comb				ed:			
0	T	O! Fisi /-	.hl \.	Coa	I-Fired U	nits			
9.	Pulve	Coal Firing (d erized-Wet Be erized-Dry Bo erfeed Stoker	ottom	clones	□s		☐ Traveling Gr ☐ Fluidized Be	d	
10.	. Flyash Reinjection:								
	☐ Yes ☐ No								
11.	Overfire	Air:							
	Yes	□No							
				Oil-	Fired Un	its			
12.	Oil Prehe	eater:							
	☐ Yes - Indicate Temperaturedeg. F								

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

- Company identification (name for air contaminant source for which you are applying): FISCHER-TROPSCH CATALYST REGEN AND PROCESS VENTS
- List all equipment that are part of this air contaminant source: ALL F-T AND PRODUCT UPGRADE VENTS CONTROLLED BY 150 MMBtu/hr LOW PRESSURE FLARE
- Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 OR after issuance of PTI \_\_\_\_\_

- 4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.
  - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
  - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
  - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit
    emissions in line # 8 or have described inherent limitations below.
  - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
  - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	2.3	2.3	10.0	2.3	10.0
PM <sub>10</sub> (PM < 10 microns in diameter)	2.3	2.3	10.0	2.3	10.0
Sulfur dioxide (SO <sub>2</sub> )	0.2	0.2	0.8	0.2	0.8
Nitrogen oxides (NO <sub>x</sub> )	30.0	30.0	131.4	30.0	131.4
Carbon monoxide (CO)	25.2	25.2	110.3	25.2	110.3
Organic compounds (OC)	1.6	0.03	0.1	0.03	0.1
Volatile organic compounds (VOC)	1.6	0.03	0.1	0.03	0.1
Total HAPs	0.6	0.02	0.07	0.02	0.07
Highest single HAP (hexane):	0.5	0.01	0.06	0.01	0.06
Air Toxics (see instructions):	0.6	0.02	0.07	0.02	0.07

5.

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SC Nitrogen oxides = NOx; Carbon monoxide = CO    Cyclone/Multiclone		
Manufacturer:		
Pollutant(s) controlled:   PE   OC   SO2   NOX   CO   Other		Year installed:
This is the only control equipment or this air contaminant source   fno, this control equipment is:   Primary   Secondary   Parallel   List any other air contaminant sources that are also vented to this control equipment:    Fabric Filter/Baghouse   Manufacturer:   Year installed:   What do you call this control equipment:   Pollutant(s) controlled:   PE   OC   SO2   NOX   CO   Other   Estimated capture efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Operating pressure drop range (inches of water): Minimum:   Maximum:   Pressure type:   Negative pressure   Positive pressure   Shaker   Other   Lime injection or fabric coating agent used: Type:   Feed rate:   This is the only control equipment on this air contaminant source   If no, this control equipment is:   Primary   Secondary   Parallel   List any other air contaminant sources that are also vented to this control equipment:   Wet Scrubber   Manufacturer:   Year installed:   Year installed:   PE   OC   SO2   NOX   CO   Other   Estimated capture efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Design control efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Design	Pollutant(s) controlled: ☐ PE ☐ OC	□ SO <sub>2</sub> □ NOx □ CO □ Other
Fabric Filter/Baghouse   Manufacturer:   Year installed:   What do you call this control equipment   Passure   Positive pressure   Positive pressure   Positive contaminant sources that are also vented to this control equipment:	Type: 🔲 Cyclone 📙 Multiclone 📙 Rotock	one [] Other
Manufacturer:	☐ This is the only control equipment on this if no, this control equipment is: ☐ Primary	air contaminant source ☐ Secondary ☐ Parallel
What do you call this control equipment:  Pollutant(s) controlled:	Fabric Filter/Baghouse	
Pollutant(s) controlled: □ PE □ OC □ SO₂ □ NOx □ CO □ Other Estimated capture efficiency (%): □ Basis for efficiency: □ Operating pressure drop range (inches of water): Minimum: □ Maximum: □ Pressure type: □ Negative pressure □ Positive pressure □ Other □ Lime injection or fabric coating agent used: Type: □ Feed rate: □ This is the only control equipment on this air contaminant source If no, this control equipment is: □ Primary □ Secondary □ Parallel List any other air contaminant sources that are also vented to this control equipment: □ Nother □ Sesimated capture efficiency (%): □ Basis for efficiency: □ Spray chamber □ Packed bed □ Impingement □ Venturi □ Other □ Operating pressure drop range (inches of water): Minimum: □ Maximum: □ PH range for scrubbing liquid: Minimum: □ Maximum: □ Scrubbing liquid flow rate (gal/min): □ Is scrubber liquid recirculated? □ Yes □ No  Water supply pressure (psig): □ NOTE: This item for spray chambers only. □ This is the only control equipment is: □ Primary □ Secondary □ Parallel	Manufacturer:	Year installed:
Fressure type:   Negative pressure   Positive pressure   Fabric cleaning mechanism:   Reverse air   Pulse jet   Shaker   Other   Lime injection or fabric coating agent used: Type:   Feed rate:   This is the only control equipment on this air contaminant source   If no, this control equipment is:   Primary   Secondary   Parallel   List any other air contaminant sources that are also vented to this control equipment:   Wet Scrubber   Manufacturer:   Year installed:   What do you call this control equipment:   Pollutant(s) controlled:   PE   OC   SO2   NOX   CO   Other   Estimated capture efficiency (%):   Basis for efficiency:   Design control efficiency (%):   Basis for efficiency:   Type:   Spray chamber   Packed bed   Impingement   Venturi   Other   Operating pressure drop range (inches of water): Minimum:   Maximum:   PH range for scrubbing liquid: Minimum:   Maximum:   Scrubbing liquid flow rate (gal/min):   Is scrubber liquid recirculated?   Yes   No   NoTE: This item for spray chambers only.   This is the only control equipment on this air contaminant source   If no, this control equipment is:   Primary   Secondary   Parallel	Pollutant(s) controlled: □ PF □ OC	□ SO <sub>2</sub> □ NO <sub>2</sub> □ CO □ Other
Fressure type:   Negative pressure   Positive pressure   Fabric cleaning mechanism:   Reverse air   Pulse jet   Shaker   Other   Lime injection or fabric coating agent used: Type:   Feed rate:   This is the only control equipment on this air contaminant source   If no, this control equipment is:   Primary   Secondary   Parallel   List any other air contaminant sources that are also vented to this control equipment:   What do you call this control equipment:   Year installed:   What do you call this control equipment:   Pollutant(s) controlled:   PE	Design control efficiency (%): Operating pressure drop range (inches of wa	Basis for efficiency:ater): Maximum: Maximum:
□ Lime injection or fabric coating agent used: Type: Feed rate:   □ This is the only control equipment on this air contaminant source   If no, this control equipment is: □ Primary □ Secondary □ Parallel   List any other air contaminant sources that are also vented to this control equipment:    Wet Scrubber  Manufacturer: Year installed:	Pressure type:	Positive pressure
If no, this control equipment is:		
Manufacturer:	If no, this control equipment is:   Primary	☐ Secondary ☐ Parallel
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other		
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other		
Design control efficiency (%): Basis for efficiency:  Type:	Manufacturer:	Year installed:
Operating pressure drop range (inches of water): Minimum: Maximum: pH range for scrubbing liquid: Minimum: Maximum: Maximum: Scrubbing liquid flow rate (gal/min): ls scrubber liquid recirculated?	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC  Estimated capture efficiency (%):	☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other Basis for efficiency:
pH range for scrubbing liquid: Minimum: Maximum: Scrubbing liquid flow rate (gal/min): Is scrubber liquid recirculated? ☐ Yes ☐ No Water supply pressure (psig): NOTE: This item for spray chambers only. ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC  Estimated capture efficiency (%):  Design control efficiency (%):	☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other Basis for efficiency: Basis for efficiency:
Water supply pressure (psig):NOTE: This item for spray chambers only.  ☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: □ PE □ OC  Estimated capture efficiency (%):  Design control efficiency (%):  Type: □ Spray chamber □ Packed bed □	☐ SO₂ ☐ NOx ☐ CO ☐ Other Basis for efficiency: Basis for efficiency: ☐ Impingement ☐ Venturi ☐ Other
<ul> <li>☐ This is the only control equipment on this air contaminant source</li> <li>If no, this control equipment is:</li> <li>☐ Primary</li> <li>☐ Secondary</li> <li>☐ Parallel</li> </ul>	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC  Estimated capture efficiency (%):  Design control efficiency (%):  Type: ☐ Spray chamber ☐ Packed bed ☐ Operating pressure drop range (inches of wapH range for scrubbing liquid: Minimum:  Scrubbing liquid flow rate (gal/min):	☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other
List any other all contaminant sources that are also vented to this control equipment.	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC  Estimated capture efficiency (%):  Design control efficiency (%):  Type: ☐ Spray chamber ☐ Packed bed ☐  Operating pressure drop range (inches of wapH range for scrubbing liquid: Minimum:  Scrubbing liquid flow rate (gal/min):  Is scrubber liquid recirculated? ☐ Yes ☐	SO <sub>2</sub> NOx CO Other Basis for efficiency: Basis for efficiency: Impingement Venturi Other ater): Minimum: Maximum: Maximum:
	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC  Estimated capture efficiency (%):  Design control efficiency (%):  Type: ☐ Spray chamber ☐ Packed bed ☐ Operating pressure drop range (inches of wapH range for scrubbing liquid: Minimum:  Scrubbing liquid flow rate (gal/min):  Is scrubber liquid recirculated? ☐ Yes ☐ Water supply pressure (psig):  ☐ This is the only control equipment on this If no, this control equipment is: ☐ Primary	□ SO <sub>2</sub> □ NOx □ CO □ Other Basis for efficiency: □ Basis for efficiency: □ Impingement □ Venturi □ Other ater): Minimum: □ Maximum: □ Maximum: □ NOTE: This item for spray chambers only. air contaminant source □ Secondary □ Parallel
	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: □ PE □ OC  Estimated capture efficiency (%):  Design control efficiency (%):  Type: □ Spray chamber □ Packed bed □  Operating pressure drop range (inches of wa pH range for scrubbing liquid: Minimum:  Scrubbing liquid flow rate (gal/min):  Is scrubber liquid recirculated? □ Yes □  Water supply pressure (psig):  □ This is the only control equipment on this  If no, this control equipment is: □ Primary	□ SO <sub>2</sub> □ NOx □ CO □ Other Basis for efficiency: □ Basis for efficiency: □ Impingement □ Venturi □ Other ater): Minimum: □ Maximum: □ Maximum: □ NOTE: This item for spray chambers only. air contaminant source □ Secondary □ Parallel
Manufacturer: Year installed: What do you call this control equipment:	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC  Estimated capture efficiency (%):  Design control efficiency (%):  Type: ☐ Spray chamber ☐ Packed bed ☐ Operating pressure drop range (inches of wapH range for scrubbing liquid: Minimum:  Scrubbing liquid flow rate (gal/min):  Is scrubber liquid recirculated? ☐ Yes ☐ Water supply pressure (psig):  ☐ This is the only control equipment on this If no, this control equipment is: ☐ Primary List any other air contaminant sources that a Belectrostatic Precipitator  Manufacturer:	□ SO <sub>2</sub> □ NOx □ CO □ Other Basis for efficiency: □ Basis for efficiency: □ Impingement □ Venturi □ Other □ Maximum: □ Maximum: □ NOTE: This item for spray chambers only. air contaminant source □ Secondary □ Parallel ure also vented to this control equipment:

<u> - 11 n</u>	Specific Air Contaminant Source Information		
	Estimated capture efficiency (%):	Basis for efficiency:	
	Design control efficiency (%):	Basis for efficiency:	
	Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular	П Wet П Other	<del></del>
	Number of operating fields:		
	☐ This is the only control equipment on this a	air contaminant source	
	If no, this control equipment is:   Primary		
	List any other air contaminant sources that are	e also vented to this control equipment:	
П	Concentrator		
	Manufacturer:	Year installed:	
	Manufacturer: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC		
	Pollutant(s) controlled: ☐ PE ☐ OC	□ SO₂ □ NOx □ CO □ Other	
	Estimated capture efficiency (%):	Basis for efficiency:	
	Design regeneration cycle time (minutes):		
	Design regeneration cycle time (minutes): Minimum desorption air stream temperature (	<u>E</u> /·	
	Rotational rate (revolutions/hour):	/·	
	Rotational rate (revolutions/hour):  This is the only control equipment on this a	 air contaminant source	
	If no, this control equipment is:  Primary	C Secondary C Parallol	
	List any other air contaminant sources that are	□ Secondary □ Faranci	
	List any other all contaminant sources that are	e also vertice to this control equipment.	
	Catalytic Incinerator		
	Manufacturer:	Year installed:	
	What do you call this control equipment:	real instancu.	
	Pollutant(s) controlled: PE CC		
	Foliation of the Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Controlled Contr	Designed Index I Co I Other _	
	Estimated capture efficiency (%):	Basis for enciency:	
	Design control efficiency (%):	basis for emiciency:	
	Minimum inlet gas temperature (°F):		
	Combustion chamber residence time (second		
	Minimum temperature difference (°F) across of		on:
	☐ This is the only control equipment on this a		
	If no, this control equipment is:   Primary		
	List any other air contaminant sources that are	e also vented to this control equipment:	
_	Thermal Incinerator/Thermal Oxidizer		
	Manufacturer:	Year installed:	
		real installed.	
	What do you call this control equipment:		
	Pollutant(s) controlled: PE OC	☐ SO <sub>2</sub> ☐ NOx ☐ CO ☐ Other _	
	Estimated capture efficiency (%):	Basis for efficiency:	
	Design control efficiency (%):	Basis for efficiency:	
	Design control efficiency (%): Minimum operating temperature (°F) and loca	Basis for efficiency:(See li	ne by line instructions.
	Combustion chamber residence time (second	S):	
	☐ This is the only control equipment on this a		
	If no, this control equipment is: 🔲 Primary		
	List any other air contaminant sources that are	e also vented to this control equipment:	
$\boxtimes$	Flare Manufacturer: TO BE DETERMINED	Vagrinatellad: 2009	
	Manufacturer: TO BE DETERMINED	Year installed: 2008	
	What do you call this control equipment: LOW		00
		□ SO <sub>2</sub> □ NOx □ CO ☑ Other V	
	Estimated capture efficiency (%): 100	Basis for efficiency: ENGINEERING DESIG	-iN
	Design control efficiency (%): 98	Basis for efficiency: EPA	
	Type: ☐ Enclosed ☒ Elevated (open)		
	Ignition device: ☐ Electric arc ☑ Pilot flam-	e	
	Flame presence sensor: ☑ Yes □ No		

☑ This is the only control equipment on this air contaminant source

	- Specific Air Contaminant Source Information If no, this control equipment is: ☐ Primary List any other air contaminant sources that	y ☐ Secondary ☐ Parallel
	Condenser  Manufacturer:	Year installed:
	What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC	□ SO₂ □ NOx □ CO □ Other
	Estimated capture efficiency (%):  Design control efficiency (%):	Basis for efficiency: Basis for efficiency:
	Cooley the second	ring air contaminant source operation:
	Design coolant temperature (°F): Minimum Design coolant flow rate (gpm):	Maximum
	☐ This is the only control equipment on thi If no, this control equipment is: ☐ Primary List any other air contaminant sources that	is air contaminant source y ☐ Secondary ☐ Parallel
	Carbon Absorber	
	Manufacturer:What do you call this control equipment:	Year installed:
	Pollutant(s) controlled: ☐ PE ☐ OC Estimated capture efficiency (%):	□ SO <sub>2</sub> □ NOx □ CO □ Other
	Design control efficiency (%):	Basis for efficiency:
	Type: ☐ On-site regenerative ☐ Disposa Maximum design outlet organic compound	concentration (ppmv):
	Carbon replacement frequency or regenera	ation cycle time (specify units):
	Maximum temperature of the carbon bed, a  ☐ This is the only control equipment on thi	after regeneration (including any cooling cycle): is air contaminant source
	If no, this control equipment is:  Primary List any other air contaminant sources that	y ☐ Secondary ☐ Parallel
	Dry Scrubber	
	Manufacturer:	Year installed:
	What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC	□ SO <sub>2</sub> □ NOx □ CO □ Other
	Estimated capture efficiency (%):	Basis for efficiency:
	Design control efficiency (%): Reagent(s) used: Type:	Basis for efficiency:
•	Operating pressure drop range (inches of w	Injection rate(s): vater): Minimum: Maximum:
	This is the only control equipment on this	is air contaminant source
	If no, this control equipment is:   Primary List any other air contaminant sources that	
	Paint booth filter	
u	Type: ☐ Paper ☐ Fiberglass ☐ Water o	curtain  Other Basis for efficiency:
	Other, describe	
	Manufacturer:	Year installed:
	What do you call this control equipment:	
	Estimated capture efficiency (%):	Basis for efficiency:
	Design control efficiency (%):	Basis for efficiency:

☐ This is the only control equipment on this air contaminant source						
f no, this control equipment is:						

- 6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.
- 7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- · Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- · Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information							
Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)	
CATALYST REGEN AND PROCESS VENTS	Α	ROUND (9-FT ID)	193	1,000 to 2,000	248,000	600	

<sup>\*</sup>Type codes for stack egress points:

- A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
- B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
- C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

	Table 7-B, Fugitive Egress Point Information						
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)		
NA							

\*Type codes for fugitive egress point:

- D. door or window
- E. other opening in the building without a duct
- F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)							
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)				
CATALYST REGEN AND PROCESS VENTS	580 (COOLING TOWER)	240	240				

8. Request for Federally Enforceable Limits

			permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific sted below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?
	□ yes ⊠ no □ nots	ure - ple	ease contact me if this affects me
	If yes, w	hy are y	you requesting federally enforceable limits? Check all that apply.
	a.		to avoid being a major source (see OAC rule 3745-77-01)
	b. C.		to avoid being a major MACT source (see OAC rule 3745-31-01) to avoid being a major modification (see OAC rule 3745-31-01)
	d.	H	to avoid being a major stationary source (see OAC rule 3745-31-01)
	e.		to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
-	f.	Ħ	to avoid another requirement. Describe:
			· · · · · · · · · · · · · · · · · · ·

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

 If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10.	Do you wish to permit this air contaminant source as a portable source	, allowing relocation within the state in accordance
	with OAC rule 3745-31-03 or OAC rule 3745-31-05?	•

	yes	- l	vote:	notification	requiremen	ts in	rules	cited	above	must	be f	ollowe	ed
Ø	ďΩ												

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE FACILITY ID:	
EU ID:	PTI #:

# EMISSIONS ACTIVITY CATEGORY FORM FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

Reason this form is being submi	tted (check one)	
New Permit ☐ Renewa     LOW PRESSURE FLARE	ıl or Modification of Air Permit Num	ber(s) (e.g. B001)
Maximum Operating Schedule:	24hours per day;36	5days per year
If the schedule is less than 24 homaximum? See instructions for	ours/day or 365 days/year, what linexamples.	
Input Capacity (million Btu/hr):		
Rated (Indicate units if other than mmBtu/hr)	Maximum (Indicate units if other than mmBtu/hr)	Normal (Indicate units if other than mmBtu/hr)
TO BE DETERMINED	150	150
Rated (lb steam/hr)	Maximum (lb steam/hr)	Normal (lb steam/hr)
Not applicable - operation de	oes not produce steam.	
Percent of Operating Time Used	l for:	
Process: 100 % Space Heat: 0 %		
Type of Draft (check one):		
☐ Natural ☐ Induced ⊠ F	Forced	
Type of combustion monitoring	(check one):	
☐ Fuel/Air Ratio ☐ Oxygen ☑ Other (describe) FLAME	None	

8. Type of	f Fuel Fired (d	<u>co</u> mplete all t	hat apply	·):			
Fuel*	Fired as	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary 図 Backup	950/SCF		NIL	5.1 MM	580 ft <sup>3</sup>	580 ft <sup>3</sup>
Wood	☐ Primary ☐ Backup		annosco Agreemaniani		tons	lbs	lbs
LPG	Primary Backup				gal	gal	gal
Other** TAILGAS	☐ Primary☐ Backup	487.5/SCF	TO THE LEWIS CONTROL	NIL	9.9 MMSCF	1,130 SCF	1,130 SCF
Other**	☐ Primary ☐ Backup						
	entify all comb her fuel(s): TA		uels that a	are co-fire	ed:	<u>-</u>	<u> </u>
9. Type of	Coal Firing (c	heck one):	Coal	-Fired Ur	nits		
☐ Pulve	erized-Wet Bo erized-Dry Bo erfeed Stoker	ottom	nd-Fired lones Other	Sr	nain Grate preader Stoker	Traveling Gra	Ė
10. Flyash Reinjection:							
Yes	☐ No						
I1. Overfire	Air:						
☐ Yes	☐ No						
2. Oil Prehe	Oil-Fired Units 2. Oil Preheater:						
☐ Yes -	- Indicate Ten	perature	deg	. F			

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

- Company identification (name for air contaminant source for which you are applying): EQUIPMENT LEAKS FROM MISCELLANEOUS VALVES, PUMPS, FLANGES, AND COMPRESSOR SEALS
- List all equipment that are part of this air contaminant source: CURRENT ESTIMATES INCLUDE 20 PUMPS, 250 PROCESS VALVES, 540 FLANGES, AND 13 COMPRESSOR SEALS.
- Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 OR after issuance of PTI

- 4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.
  - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
  - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
  - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit
    emissions in line # 8 or have described inherent limitations below.
  - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
  - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0	0	0	0	0
PM <sub>10</sub> (PM < 10 microns in diameter)	0	0	0	0	0
Sulfur dioxide (SO <sub>2</sub> )	0	0	0	0	0
Nitrogen oxides (NO <sub>x</sub> )	0	0	0	0	0
Carbon monoxide (CO)	0	0	0	0	0
Organic compounds (OC)	29.7	0.4	1.7	0.4	1.7
Volatile organic compounds (VOC)	29.7	0.4	1.7	0.4	1.7
Total HAPs	3.3	<0.1	0.2	<0.1	0.2
Highest single HAP:	3.3	<0.1	0.2	<0.1	0.2
Air Toxics (see instructions):	3.3	<0.1	0.2	<0.1	0.2

Section II - Specific Air Contaminant Section III - Specific Air Contaminat Section III - Specific Air Contaminat Section III - Specifi	Source Informa	tion
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5.

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

	/es - fill out the applicable information below.  lo - proceed to item # 6.
<b>□</b> 1	
	Note: Dell'atent alchanically
	Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO Nitrogen oxides = NOx; Carbon monoxide = CO
	Cyclone/Multiclone
	Manufacturer: Year installed:
	what do you call this control entitlement.
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Estimated Capture emclency (%): Hasis for efficiency:
	Posign control entitlency (70). Basis for afficiency.
	Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ☐
	☐ This is the only control equipment on this air contaminant source  If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
] F	abric Filter/Baghouse
	Manufacturer: Voor installed:
	What do you call this control equipment:
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other
	Louindieu Cabille eniciency (%) Rosis for officionar
	Design control efficiency (%):  Operating pressure drop range (inches of water): Minimum:  Pressure type: In Negative pressure.  Basis for efficiency:  Maximum:  Maximum:
	Operating pressure drop range (inches of water): Minimum: Maximum:
	resoure type. In regative pressure in Positive pressure
	Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other
	□ Lime injection or fabric coating agent used; Type: Feed rate
	☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
	List any other air contaminant sources that are also vented to this control equipment:
	y and the control of the control equipment.
) <b>\</b>	Vet Scrubber
	Manufacturer: Year installed:
	What do you call this control equipment:
	Pollutant(s) controlled: T. PE. T. OC. T. SO. T. NOV. T. CO. T. OV.
	Estimated capture efficiency (%): Basis for efficiency:
	Estimated capture efficiency (%):  Design control efficiency (%):  Type: G. Spray chamber G. Packed bed G. Impigagment G. Vest vi. 50.04
	The chief organized in a government is sufficient to the first the chief.
	Operating pressure drop range (inches of water); Minimum; Maximum: .
	Prinarige for scrubbling liquid; Minimum; Maximum.
	Scrubbing liquid flow rate (gal/min):
	Is scrubber liquid recirculated?   Yes  No
	Water supply pressure (psig):NOTE: This item for spray chambers only.
	Lithis is the only control equipment on this air contaminant source
	If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel  List any other air contaminant sources that are also vented to this control equipment:
) E	lectrostatic Precipitator
E	lectrostatic Precipitator  Manufacturer: Year installed: What do you call this control equipment:

Section II	I - Specific Air Contaminant Source Information	·	•
	Estimated capture efficiency (%):  Design control efficiency (%):	Basis for efficiency:  Basis for efficiency:	
	Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Number of operating fields:	Wet ☐ Other	
	<ul> <li>☐ This is the only control equipment on this air c</li> <li>If no, this control equipment is: ☐ Primary</li> <li>List any other air contaminant sources that are al</li> </ul>	□ Secondary □ Parallel	ment:
	Concentrator		
	Manufacturer:	Year installed:	
	What do you call this control equipment:  Pollutant(s) controlled: ☐ PE ☐ OC ☐  Estimated capture efficiency (%):		
	Festimated capture efficiency (%):	SO <sub>2</sub> NOx CO	Other
	Design regeneration cycle time (minutes):  Minimum desorption air stream temperature (°F):		
	Rotational rate (revolutions/hour):		
	☐ This is the only control equipment on this air control	ontaminant source	
	If no, this control equipment is: ☐ Primary	☐ Secondary ☐ Parallel	
	List any other air contaminant sources that are als	so vented to this control equipm	nent:
	Catalytic Incinerator		-
	Manufacturer:	Year installed:	
	Manufacturer:  What do you call this control equipment:  Pollutant(s) controlled: □ PE □ OC □ :  Estimated capture efficiency (%):		
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ :	SO₂ □ NOx □ CO	☐ Other
	Estimated capture efficiency (76)	Dasis for efficiency:	
	Design control efficiency (%): [Figure 1]  Minimum inlet gas temperature (°F):	Basis for efficiency:	
	Combustion chamber residence time (seconds):		
	Minimum temperature difference (°F) across catal	lyst during air contaminant sou	roo operation.
	☐ This is the only control equipment on this air co	ontaminant source	rce operation.
	If no, this control equipment is:  Primary [	☐ Secondary ☐ Parallel	
	List any other air contaminant sources that are als	so vented to this control equipment	ent:
	Thermal Incinerator/Thermal Oxidizer	<u></u>	
		/ear installed:	
	What do you call this control equipment:		
	Pollutant(s) controlled: T PF T OC T S	SO <sub>2</sub>	□ Other
	Estimated capture efficiency (%):	Rasis for efficiency:	
	Design control efficiency (%):	Basis for efficiency:	
	Design control efficiency (%):  Minimum operating temperature (°F) and location:  Combustion chamber residence time (seconds):		(See line by line instructions.
	compaction and inper residence title (securids).		
	☐ This is the only control equipment on this air confinent in this control equipment is: ☐ Primary ☐	Intaminant source	
	List any other air contaminant sources that are als	o vented to this control equipm	ent:
	Flare		
	Manufacturer:	'ear installed:	
	Manufacturer:		
	Pollutant(s) controlled: ☐ PE ☐ OC ☐ S	5O₂ □ NOx □ CO	☐ Other
	Estimated capture efficiency (%):	easis for efficiency:	
	Besign control efficiency (%)	lasis for efficiency:	
	Type: ☐ Enclosed ☐ Elevated (open) Ignition device: ☐ Electric arc ☐ Pilot flame		
	Flame presence sensor: ☐ Yes ☐ No		
	☐ This is the only control equipment on this air co	ntaminant source	
	y and a graph train and on our	· · · · · · · · · · · · · · · · · · ·	

### Section II - Specific Air Contaminant Source Information If no, this control equipment is: Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment: □ Condenser Year installed: \_\_ Manufacturer: \_ What do you call this control equipment: SO<sub>2</sub> NOx CO Other Pollutant(s) controlled: ☐ PE ☐ OC Basis for efficiency: Estimated capture efficiency (%):\_\_\_\_\_ Basis for efficiency: Design control efficiency (%): Type: ☐ Indirect contact ☐ Direct contact Maximum exhaust gas temperature (°F) during air contaminant source operation: Coolant type: \_\_\_\_\_\_ Design coolant temperature (°F): Minimum \_\_\_\_\_ Maximum \_\_\_\_\_ Design coolant flow rate (gpm): \_\_\_\_\_ ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: Primary Secondary Parallel List any other air contaminant sources that are also vented to this control equipment: Carbon Absorber Year installed: Manufacturer: What do you call this control equipment: ☐ SO<sub>2</sub> ☐ NOx ☐ CO ☐ Other\_\_\_\_\_ Pollutant(s) controlled: ☐ PE ☐ OC Basis for efficiency: Estimated capture efficiency (%):\_\_\_\_\_\_ Design control efficiency (%): Type: ☐ On-site regenerative ☐ Disposable Basis for efficiency: Maximum design outlet organic compound concentration (ppmv): \_\_\_\_\_ Carbon replacement frequency or regeneration cycle time (specify units): Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment: Dry Scrubber П Year installed: Manufacturer: What do you call this control equipment: Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other \_\_\_\_\_ ☐ This is the only control equipment on this air contaminant source If no, this control equipment is: Primary ☐ Secondary ☐ Parallel List any other air contaminant sources that are also vented to this control equipment: Paint booth filter Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other\_\_\_\_ Design control efficiency (%):\_\_\_\_\_\_\_ Basis for efficiency:\_\_\_\_\_ Other, describe Leakless/sealless or low-emission pumps, valves, & compressors Manufacturer: TBD Year installed: 2008 What do you call this control equipment: Low-emission Equipment Pollutant(s) controlled: ☐ PE ☑ OC ☐ SO₂ ☐ NOx ☐ CO ☐ Other \_\_\_\_\_ Estimated capture efficiency (%):100 Basis for efficiency: Engineering estimate Basis for efficiency: EPA Guidance

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is:  Primary  Second Education Second Primary  Second Primary  Second Primary  Second Primary  Primary  Primary  Second Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primary  Primar	ondary   Parallel ed to this control equipment:

- 6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.
- 7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- · Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

		Table 7-A, Stack Egress Poi	int Information			
Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
NA					<u></u>	

<sup>\*</sup>Type codes for stack egress points:

- A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
- B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
- C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

		Table 7-B, Fugitive Egress Point Information		onco	
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
EQUIPMENT LEAKS	F	COMPONENT CONNECTIONS IN CONTACT WITH GASEOUS OR LIGHT LIQUID	VARIES	VARIES	VARIES

- D. door or window
- E. other opening in the building without a duct
- F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

4400400	Table 7-C, Egres	s Point Additional	nformation (Add rows a	s necessary)	
np:	any ID or Name for th	ne Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
	900.9. d				
8.	Request for Federa	ally Enforceable Limit	s		
	As part of this per requirements listed	mit application, do yo l below, (i.e., are you	u wish to propose volunta requesting federally enfor	ry restrictions to limit e rceable limits to obtain	missions in order to avoid s synthetic minor status)?
	<ul><li>□ yes</li><li>⋈ no</li><li>□ not sure - pleas</li></ul>	e contact me if this a	ffects me		
	If yes, why are you	requesting federally	enforceable limits? Checl	k all that apply.	
	b.	avoid being a major i avoid being a major s avoid being a major s avoid an air dispersion avoid another require avoid another require	a facility-wide potential to	ule 3745-31-01) e 3745-31-01) C rule 3745-31-01) see Engineering Guide	or each pollutant) and synt
	minor strategy to th	iis application. (See ge analysis to this app	line by line instructions for	definition of PTE.) If	ou checked c., please atta
Э. 	If this air contamina compliance, comple	ant source utilizes an ete the following table	y continuous emissions m e. This does not include c	onitoring equipment for continuous parametric r	r indicating or demonstratir nonitoring systems.
	Company ID for Egress Point	Type of Monitor		able performance cation (40 CFR 60, lix B)	Pollutant(s) Monitored
		3 1000000			***************************************

considered complete. Refer to the list attached to the PTI instructions.

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be

FOR OHIO EPA USE FACILITY ID:	
EU 1D:	PTI #:

# EMISSIONS ACTIVITY CATEGORY FORM GENERAL PROCESS OPERATION

This form is to be completed for each process operation when there is no specific emissions activity category (EAC) form applicable. If there is more than one end product for this process, copy and complete this form for each additional product (see instructions). Several State/Federal regulations which may apply to process operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

	Reason this form is being su	ubmitted (Check	k one)	
'001	☑ New Permit ☐ Rene	wal or Modificat	tion of Air Permit Num	nber(s) (e.g.
	Maximum Operating Schedu	ule:24	hours per day ;	7days per year
	If the schedule is less than 2 maximum? See instructions	24 hours/day or s for examples.	365 days/year, what	limits the schedule to less than
	End product of this process:	PRODUCT	T FUELS	
-	Hourly production rates (indi "Maximum" and "Average" for	icate appropriat or new versus e	e units). Please see t xisting operations:	the instructions for clarification of
	Hourly		Rate	Units (e.g., widgets)
	Average production	2,083.3		BARRELS
	Maximum production	2,083.3	999999	BARRELS

<b>5</b> .	Annual production rates (indicate appropriate units) Please see the instructions for clarification of
	"Maximum" and "Actual" for new versus existing operations:
	ū ·

Annual	Rate	Units (e.g., widgets)
Actual production	18.25	MILLION BARRELS
Maximum production	18.25	MILLION BARRELS

>1 /b.	ease check one):		
<ul><li>☐ Continuous</li><li>☐ Batch (please com</li></ul>	nplete items below)		
Minimum time Maximum num	e* time (minutes): between cycles (minutes): _ ber of cycles per daily 24 ho nclude cycle time and set up/	ur period: /clean up time.)	
	the time the equipment is in operal	,	
Materials used in prod	cess at maximum hourly prod	fuction rate (add rows/pag	ges as needed):
Material	Physical State at Standard Conditions	Principle Use	Amount**
SYNGAS	GAS	RAW MATERIAL FOR PRODUCTION OF FUEL PRODUCTS	49 TO 65 MMscf/hr
		M. Carlos	
** Please indicate the amo	unt <u>and</u> rate (e.g., lbs/hr, gallons/h	r, lbs/cycle, etc.).	
Please provide a narra VOC content coatings Refer to application Se	unt <u>and</u> rate (e.g., lbs/hr, gallons/h ative description of the proce for the manufacture of widge ection 2.6 for Process Descri	ss below (e.g., coating of ets; emissions controlled but on the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior	by thermal oxidizer
Please provide a narra VOC content coatings Refer to application Se	ative description of the proce for the manufacture of widge ection 2.6 for Process Descri	ss below (e.g., coating of ets; emissions controlled but on the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior of the prior	by thermal oxidizer
Please provide a narra VOC content coatings Refer to application Se Product Upgrade	ative description of the proce for the manufacture of widge ection 2.6 for Process Descri	ss below (e.g., coating of ets; emissions controlled l ption information about M	by thermal oxidizer  lodule 6: F-T and
Please provide a narra VOC content coatings Refer to application Se Product Upgrade	ative description of the proce for the manufacture of widge ection 2.6 for Process Descri	ss below (e.g., coating of ets; emissions controlled l ption information about M	by thermal oxidizer
Please provide a narra VOC content coatings Refer to application Se Product Upgrade	ative description of the proce for the manufacture of widge ection 2.6 for Process Descri	ss below (e.g., coating of ets; emissions controlled l ption information about M	by thermal oxidizer)
Please provide a narra VOC content coatings Refer to application Se Product Upgrade	ative description of the proce for the manufacture of widge ection 2.6 for Process Descri	ss below (e.g., coating of ets; emissions controlled l ption information about M	by thermal oxidizer)
Please provide a narra VOC content coatings Refer to application Se Product Upgrade	ative description of the proce for the manufacture of widge ection 2.6 for Process Descri	ss below (e.g., coating of ets; emissions controlled l ption information about M	by thermal oxidizer)